

# Australian Personal Computer

ISSN—4115 NZ \$6.30 INCL. GST  
REGISTERED BY AUSTRALIA POST PUBLICATIONS VBP 3691

NOVEMBER 1988 \$4.50

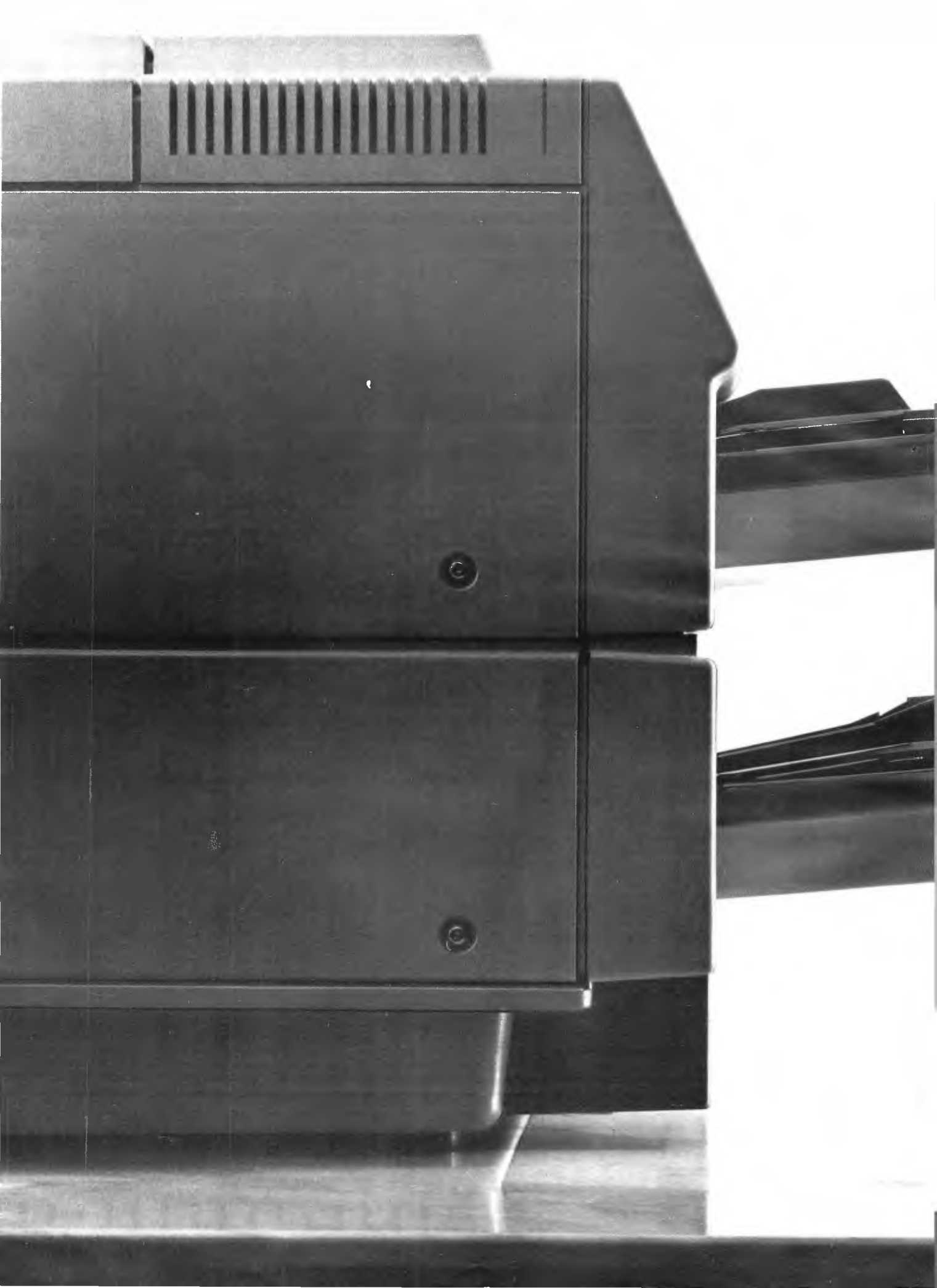
**AUSTRALIA'S TOP SELLING COMPUTER MAGAZINE**

Resizing  
RAM disks  
— on the fly



**COMPAQ LANDS ITS FIRST LAPTOP**

Packet Radio • Apricot's MCA clone • Ventura 2 • Mac System 6.0



## **OUR LATEST LASER BEAM PRINTER COMES EQUIPPED WITH TWO BARRELS**

There is no point in having the world's fastest PC or WP if your printer is a bit slow on the draw.

So the people who invented desktop LBP's in the first place, now offer a double-barrelled version. It's called the Canon LBP8IIT.

Now, at the touch of a button, you can change from letterhead to plain paper. Or envelopes, address labels, coloured paper or legal-sized paper.

And, with a list of compatible software that's more than 30 pages long, that means you can give all kinds of systems a whole lot more firepower, for not a lot of money.

An LBP with two barrels. Another reason that Canon is the Big Gun in lasers, too. You can learn more about it from us, or your Canon dealer.



# **Canon**

NSW (02) 886 3263, VIC (03) 200 6200,  
QLD (07) 844 4141, SA (08) 354 8163,  
WA (09) 445 3977, ACT (062) 80 5798.

LHV/CS006



# CONTENTS

Volume 9 Number 11 November 1988

## REGULARS

### 5 NEWSPRINT

What's new in the world of microcomputing, including details of EISA — the bus which could challenge the Micro Channel as the future standard for PC-compatible computing; Steve Jobs' NeXT — launched with all the razzamatazz you'd expect from the man who founded Apple; Toshiba's latest portables which rounded off the busiest month ever for portable PC launches; a 20Mbyte floppy disk drive; a multi-tasking Risc operating system from Acorn; and the legal trouble brewing on the shareware front.

### 25 STATESIDE

APC's US correspondent, Tim Bjarin, reports that the Dynabook concept takes a step closer to reality with the launch of NEC's UltraLite, and he reveals an inexpensive but essential utility for laptop owners.

### 265 TJ'S WORKSHOP

The ever-popular pages of hints and tips from our readers to help you get more out of your micro.

### 291 COMMUNICATIONS

Steve Withers and John Della-Torre describe a new shareware communications package, GT Power.

### 295 LETTERS

Something to say? APC's Letters column is the place to do it.

### 297 BIBLIOFILE

Instead of getting lost in the syntax of dBASE IV, why not check out some books on databases?

### 303 AFTER DARK

What do Pac-Men, Charles Darwin and a biological starship have in common? Answer: Captain Blood, one of this month's games reviewed by Chris Cain.

### 309 ENDZONE

Our usual puzzles and diversions from Mike Mudge and JJ Clessa, along with Diary Data and a User Group Update.

### 314 MARKETPLACE

APC's Customer Service Directory contains a myriad of services, from refurbishing ribbons to fancy fonts.

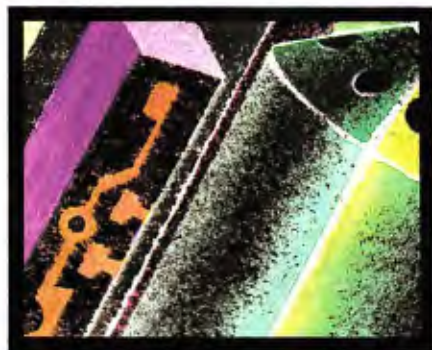
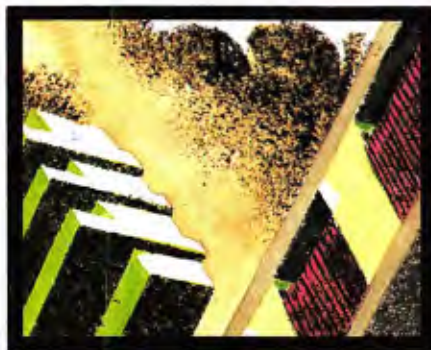
### 320 ADVERTISERS' INDEX

A comprehensive list of computer companies in this issue of APC.

### 167 ACCOUNTING PACKAGES FOR LANs

In the second of our three-part series, Touche Ross experts look at multi-user packages based on MS-DOS compatible networks.

- AccountMate
- Commercial Business Applications
- Multisoft
- Pacsoft
- RealWorld
- Satchel
- SunSystem
- Jewel
- MacLedgers
- Last Accounting System



**Managing Editor:** Sean Howard; **Assistant Editor:** Cathie Kennedy; **Consultant Editors:** Steve Withers, Ian Davies. **Advertising:** Gerard Kohne, Iain Aitken and David Mitchell (02) 264 1266; Vic. SA, WA and Tas Sales Manager: Wendi Fraser (03) 531 8411. **Production:** Graphic Heart Pty Ltd. **Circulation and Distribution Manager:** Imogen Boas; **Subscription Enquiries:** Kellie Coles (02) 264 1266; Standard subscription rates: Australia \$54 per annum, overseas A\$88 (surface) A\$220 (airmail). **Newsstand Sales:** Network Distribution Co. 54 Park Street, Sydney 2000. **Publisher:** Computer Publications Pty Ltd (a subsidiary of Consolidated Press (Holdings) Ltd). **Sydney Office:** 124 Castlereagh Street, Sydney 2000; telephone (02) 264 1266; telex

AA 20514 CONPRES. **Melbourne Office:** 47 Glenhuntly Road, Elwood, 3184; telephone (03) 531 8411; telex AA 30333 'AMJ'. Printed by Quadricolor Industries (Aust.) Pty Ltd. Material contained within Australian Personal Computer is protected under the Commonwealth Copyright Act 1968. No material may be reproduced in part or whole without written consent from the copyright holders. Produced under licence from VNU Business Publications B.V. The article appearing on page 153 is reprinted by permission from BYTE (USA). Copyright © 1988 McGraw-Hill, Inc. All rights reserved. The articles printed on pages 102, 203, 241 and 265 are reprinted by permission from PC Magazine, MacUser and PC Tech Journal. Copyright © 1988 Ziff Communications Company. All rights reserved.



## FEATURES AND REVIEWS

### 28 COMPAQ SLT/286

The waiting is over and Compaq has finally taken the plunge with its battery-powered laptop. Peter Jackson presents the first Australian Benchtest.

### 45 APRICOT Qi

Brave Apricot has become the first manufacturer to start delivering IBM-compatible Micro Channel Architecture machines. APC was at the head of the queue, and Guy Kewney conducts the first review of the 25MHz 80386-based Qi.



### 63 HAM AND CHIPS

Rupert Goodwins and Peter Hallgarten unravel the airborne alternative to cable communications between computers and explain the advantages of packet radio.

### 73 MAINLAN

SageSoft is following up its Sagenet success with a new network which is still cheap, but now offers DOS-level facilities like virtual drives and shared files.

### 85 CRYSTAL

Ruth Wallsgrove looks at how this expert system has grown with the addition of an induction system for deriving rules from tables of data.

### 96 COMPUTEREYES

John Rankin experiments with this low-cost video acquisition system and finds it is a useful tool for adding realistic pictures to a variety of programs.

### 135 VENTURA 2 PROFESSIONAL

Kathy Lang takes an exclusive look at this new release of the best-selling and extremely capable desktop publishing package, and finds it adds almost everything a publisher could ask for.

### 153 FLOATING-POINT WITHOUT A COPROCESSOR

In the second of our two-part series, Rick Grehan shows how to get numbers to and from a binary floating-point mathematics package.

### 203 NOW WE ARE 6.0

Bigger than System 5.0 (the box, not the program), System 6.0, as Jake Paden discovers, is not necessarily the answer to all of your Mac system woes.

### 233 PIGEON SORT

Paul Birch looks at this new sorting algorithm, which — believe it or not — he claims is faster than Quicksort.

### 241 RESIZE YOUR EMS RAMDISK ON DEMAND

Michael Mefford runs through XPANDISK, a RAMdisk that you can shrink and expand to meet the memory demands of specific applications without rebooting.

### 102 PRINTER GUIDE

Printer manufacturers are squeezing more into their machines while squeezing less money out of your wallet. Our review team check out five laser and four dot-matrix printers in this month's feature.

#### Laser printers

- Dataproducts LZR 1260
- Gestetner GLX800
- Kyocera F-1000A
- OAS LaserPro Gold Express
- Sharp JX-9300

#### Dot-matrix printers

- AMT Accel-500
- Epson DFX-5000
- Hewlett-Packard DeskJet
- Seikosha SBP-10AI

Buying Personal Computers today can be a risky affair. That's where Wyse & Micro Sales combine to make the perfect team. When you purchase one of the Wyse range of 286 or 386 AT's from Micro Sales, you are not only purchasing one technically computers but you are ch a s i n g support & service from specialised in Wyse cause each Wyse AT grade path, Micro interest in ensuring customer satisfaction. Purchasing



WYSE

286 or 386 upgradable AT through Micro Sales means that you gain top flight support which guarantees you maximum productivity from your investment, today, tomorrow and in the years ahead

of the most advanced available, also guaranteed after sales an established company that computers. And because has a built-in up-Sales has a vested interest in complete satisfaction. your Wyse

# MICRO SALES

## PERSONAL COMPUTING FOR BUSINESS

Level 1, 579 Harris Street, Cnr . Harris & Macarthur Sts, Ultimo, NSW , 2007. Tel: (02) 281 3377 Fax: (02) 281 3920

Please send me more information on the Wyse range of modular, upgradable 286 & 386 AT's

Name: \_\_\_\_\_ Company: \_\_\_\_\_

Address: \_\_\_\_\_

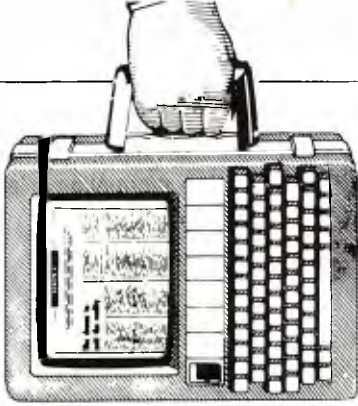
Postcode: \_\_\_\_\_ Telephone: \_\_\_\_\_

Please mail to Micro Sales, PO Box 667, Broadway, NSW, 2007

(APCNOV161)

PS. Purchasing a Wyse personal Computer From Micro Sales before November 30th, 1988 puts you in the running for a fabulous holiday in Mauritius, so don't delay.





*Guy Kewney presents his thoughts on EISA, the bus standard Olivetti, Compaq and a host of other PC suppliers hope will counter the strengthening position of IBM's Micro Channel Architecture. And, of course, there's the usual round-up of significant events in the last month of the microcomputer industry.*

## The same old song

By now, even people who don't take any interest in computers must have heard a rumour of a new 'industry standard' expansion bus.

It has been devised by Compaq, with help from people like Hewlett-Packard and Intel — all highly respected names — with a very simple object. They want to escape from IBM's domination of the market. They see this as a genuine rival to the PS/2 Micro Channel (MCA) Architecture.

I think it might be a big, big mistake for the industry. If this was to be tried, it should have been tried two years ago. And a large number of big buyers of PC products are going to be confused, and will postpone buying until the air clears.

To understand why it has happened, you have to know that in the US today, IBM is perceived to be failing and to be losing market share. Most analysts believe this is due to the 'failure' of the Micro Channel bus. These are all assumptions, answers to questions which need rather careful evaluation.

The new EISA bus, in itself, isn't awe inspiring. I have to confess that my own first reaction on seeing the specification for the 'Extended Industry Standard Architecture' (EISA) was to laugh.

For a start, it is two parallel buses (see the diagram above). The reason is it has to be compatible with the connectors inside a standard PC/AT, where the cards are

held firmly at both ends. You can't extend the AT bus lengthwise.

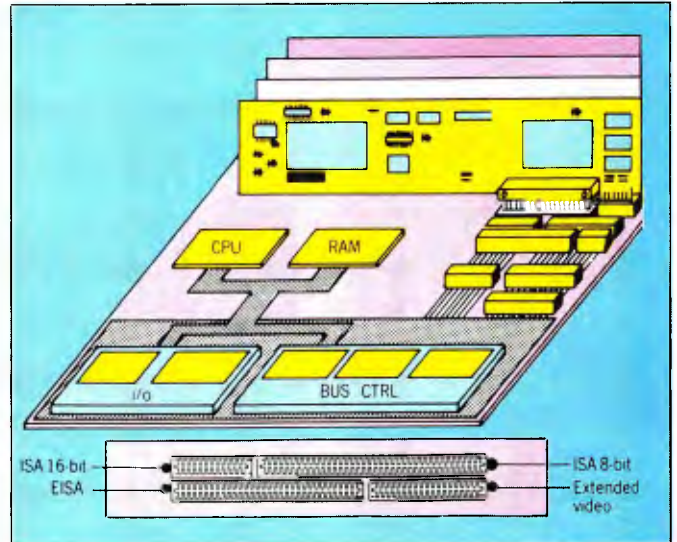
I thought about the difficulty I've had getting ordinary AT cards into their sockets, and I thought about trying to align a parallel set of plugs, stuck out on the side of the card like a pontoon, and push both of them down — and I decided to be sceptical.

My scepticism went like this: Compaq, we know, will have to make a Micro Channel machine one day. When it does, it will be under pressure to pay the patent royalties — and IBM is insisting that anyone who gets a Micro Channel licence should also pay royalties inherent in the PC and AT buses, first.

Compaq would have to pay millions, unless it could persuade IBM that it didn't need Micro Channel because it was working on something just as good.

With that sceptical approach in mind, I went looking for EISA failings, and found them. However, I was astonished to find that several of the people who support the idea actually took it seriously — very seriously indeed — not only because they thought it was something users would like, but because they genuinely thought it was an improvement on IBM's new computer standard, the PS/2 bus.

Let's look at the facts. The ordure entered the air-conditioning (to coin a phrase) in May last year when IBM announced the PS/2 with its



**The new two-in-one EISA bus**

Micro Channel, which it said was going to be the new standard for 16-bit and 32-bit machines.

The trouble was it turned out to be only a 16-bit standard because there weren't enough 32-bit chips around (the 80386). The mainstream PS/2 machines were '286-based (the Models 50 and 60).

Nobody knows for sure what the logic was behind the next move, but my guess is that IBM decided its new fledgling standard didn't need competition from inside, and so it officially pronounced the AT bus obsolete. This (important) fact missed me at the time. I saw the new Model 30, with an 8086 processor, and assumed (wrongly) that it must have a 16-bit bus in it. It didn't; it uses the PC/XT bus.

One thing is certain about the battle between the PC and the AT bus — you may

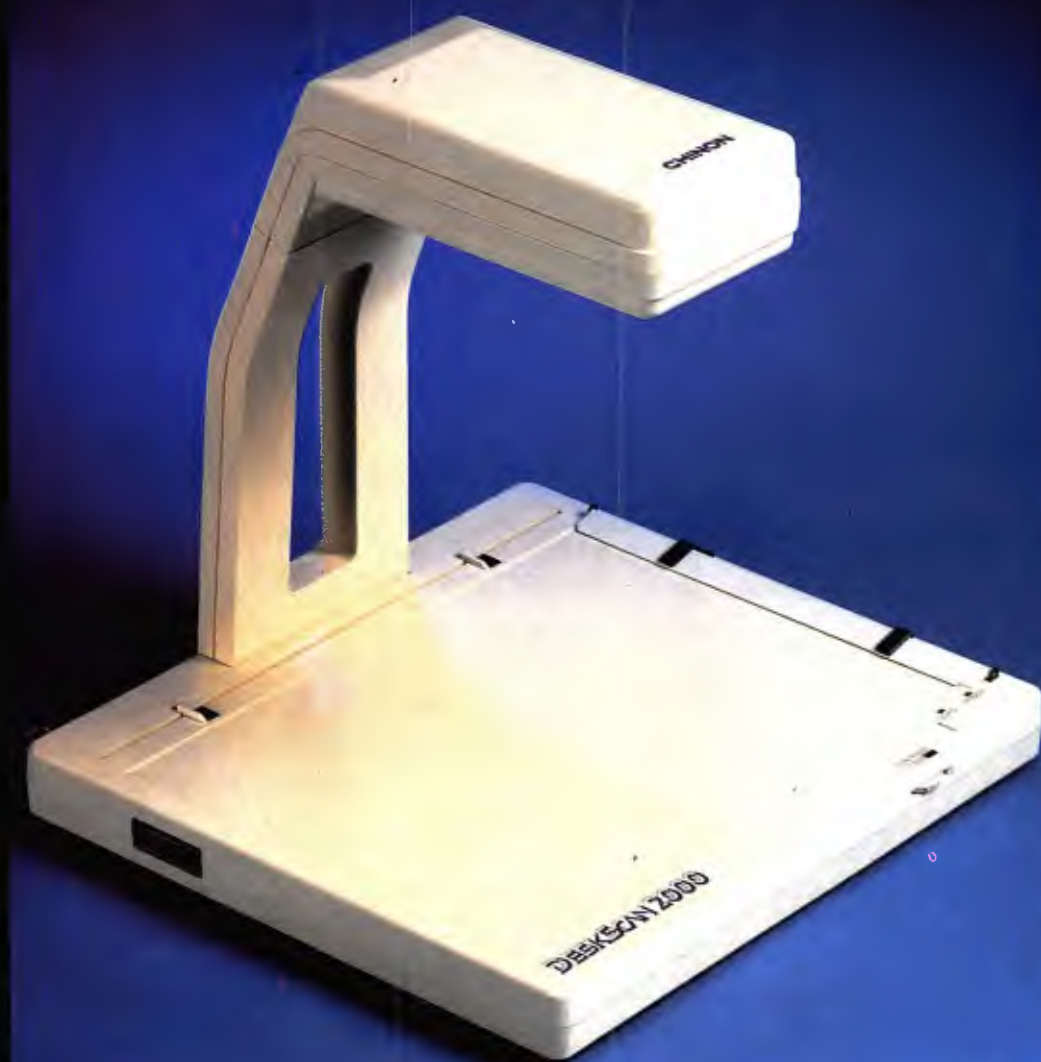
be able to plug an 8-bit PC card into an AT but you can't squeeze a 16-bit AT card into the Model 30. Many people really wanted to use 16-bit cards — often for memory expansion beyond 1Mbyte of RAM — and when IBM said they couldn't, they bought systems that did, from someone else.

To be fair, IBM wasn't as silly as it said it was. Although officially dead, both the XT286 and the AT were kept in production, and supplies continued to reach its customers. But you had to be determined to get them, and IBM only reluctantly admitted that they were in production. There is no question that this was a mistake, one that the company rectified last month with the release of a Model 30 286.

This came as a surprise to me, because two weeks before the launch the company officially denied it was



If You Could Input Anything Into  
Your Computer Instantly, Without  
Using The Keyboard, Would It Make  
Your Life Easier?



Chinon's unique new scanner could change forever the way you use your computer. DeskScan 2000 scans, digitizes, and inputs almost anything into your computer – without any keystroking. Just think how much time that could save you! Plus, with the addition of a simple add-in card, DeskScan even becomes an economical Fax.

DeskScan is perfect for use with desktop publishing or graphics software. We even have special offers on great software that comes bundled with the Scanner – at a great price.

Best of all, DeskScan 2000 is much lower priced than most full-featured scanners. That means it's finally cost-effective to put a scanner on every PC user's desk – including yours.

**CHINON**

**DESKSCAN 2000**

The Affordable Scanner From Chinon.

Turn Your Computer  
Into An  
Economical Fax!

## FAX PACKAGE II



### PACKAGE INCLUDES:

Chinon DeskScan 2000  
J.T. Fax Add-in Board  
Fax Software  
Fax Cable (Telecom Approved)  
Scanner Cable  
DeskScan 2000 Utility Software  
AC Adaptor  
User's Manual

- TRANSMIT DIRECTLY FROM SCANNER
- HIGH RESOLUTION
- COMPATIBLE WITH A WIDE RANGE OF SOFTWARE
- INPUT FROM SCANNER, DISK OR SCREEN
- COMPATIBLE WITH IBM PC's AND TRUE COMPATIBLES
- HIGH SPEED
- PARTIAL OR ENTIRE DOCUMENT TRANSMISSION
- BROADCAST CAPABILITY

Turn Your Computer  
Into A Creative  
Graphic Design Studio!

## PAINT PACKAGE II



### PACKAGE INCLUDES:

Chinon DeskScan 2000  
PC Painterbrush Plus Software  
Scanner Cable  
AC Adaptor  
User's Manual

- CHANGE ARTWORK OR GRAPHICS EASILY
- INTERFACE WITH DESKTOP PUBLISHING AND OTHER SOFTWARE
- SLIDE SHOW OR PRINTER OUTPUT
- FULL FEATURED "TOOLBOX"
- USE MOUSE, JOYSTICK OR DIGITIZER
- CHANGES COLOURS, LINES, SHAPES

Turn Your Computer  
Into A Powerful  
Desktop Publisher!

## DESKTOP PUBLISHING PACKAGE II

### PACKAGE INCLUDES:

Chinon DeskScan 2000  
Publish It! Software  
PC Painterbrush Plus Software  
Scanner Cable  
AC Adaptor  
User's Manual

- FULL FEATURED WORD PROCESSING
- PAGE LAYOUT
- TYPESETTING
- GRAPHICS
- WYSIWYG - WHAT YOU SEE IS WHAT YOU GET
- EASY TO USE
- AUTOMATIC KERNING AND LEADING
- FULL EDITING WITH BUILT-IN WORD PROCESSOR
- WIDE VARIETY OF BUILT-IN FONTS
- CONVERT WP FILES TO Publish It! FILES
- QUICK-START MINI MANUAL

## DeskScan 2000 Basic Package II

### PACKAGE INCLUDES:

DeskScan 2000  
DeskScan 2000 Utility Software  
Scanner Cable  
AC Adaptor  
User's Manual

Available from:

# SILICON CITY

**SYDNEY:**  
308 Great North Road, Abbotsford, N.S.W. 2046  
Tel: (02) 712 2911. Fax: (02) 713 8608.

**BRISBANE:**  
Cnr. Logan Road & Jurgens Street, Woolloongabba, Qld. 4102.  
Tel: (07) 891 5515. Fax: (07) 891 5506.

**PERTH:**  
176 Wittenoom Street, East Perth, W.A. 6000.  
Tel: (09) 221 3744. Fax: (09) 221 3745

**ADELAIDE STORE  
OPENING SOON!**



Dealer enquiries welcome.  
Sole Australian Distributor:

**J.I.T. (AUSTRALIA) PTY. LTD.**  
15 Stud Road, Bayswater, Victoria 3153  
Telephone: (03) 720 1333



going to launch a machine with an AT bus. Is this machine equipped with the same bus? Yes, but it's not an AT bus, I was told. It's the XT286 bus. Yes, that's the same bus, but with a smaller box so you can't fit the extra inch or so height of the full AT card. This sort of weaseling doesn't help IBM's case which is, on the face of it, pretty strong.

Chet Heath, one of the engineers who designed the PS/2, briefed a few Press people on the issues behind Micro Channel the day after the launches of the IBM 30 286 and the EISA.

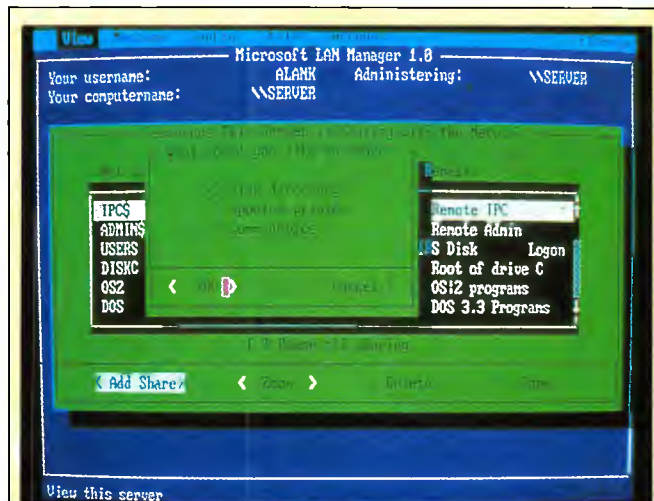
In essence, he said IBM had considered expanding the AT bus and had rejected the notion, for no single reason, but for a combination of reasons. Specifically, the AT bus is not well suited to high speeds. It will broadcast interference, not just to TVs and radios, but also to devices in the box.

Because the interrupts on the AT bus (every time you press a key, you generate a system interrupt) are 'edge'-triggered (a sudden rise or fall in voltage), this interference can persuade the system that something has happened when it hasn't. Or, when there is an interrupt, that it is over before it really is.

By contrast, the PS/2 uses level-triggered interrupts — the voltage has to stay high or low, not just flicker.

The PC-style connector of the old bus is not suited to surface-mount technology. It takes up an enormous amount of space on the main circuit board and, unlike surface-mount, it isn't possible to have components on both sides of the board. Heath says that the ratio is about 8:1 — that is, you can get eight times as much on a surface mount board.

When you plug in a new board, the Micro Channel doesn't demand that you have to know how to set the switches on it. It has switches, but they are electronic, and the machine



**After many months of hype and with more pledges of allegiance than even Oliver North could keep up with, the Microsoft/3Com LAN Manager has finally moved out of the realm of vapourware, with 3Com's launch of the 3+ Open LAN Manager.**

**Backed up by a barrage of demonstrations of OS/2 applications from major developers, the 3+ Open debut has finally brought OS/2 networking to the real world.**

**Available locally by the end of this month (November), 3Com's 3+ Open software exploits OS/2 LAN Manager's multi-tasking and enhanced-memory attributes, adds advanced security and network administration features and supports OS/2 applications that allow users to divide processing tasks between the workstation and the server.**

**Microsoft was on hand at the US launch to boast of favourable benchmark results for the LAN Manager against Novell's NetWare operating system, and to announce DEC's intention to license Microsoft's OS/2-based software for local area networks.**

**The new operating system also supports current DOS applications and can coexist with 3+, its DOS-based predecessor, officials said. The 3+ Open LAN Manager Advanced System, for an unlimited number of users, costs \$5510, while the 3+ Open LAN Manager Entry System, supporting up to five users, is priced at \$2880.**

**More than 20 industry heavyweights demonstrated about 60 OS/2 applications, in either prototype or final form, running on 3+ Open servers. The companies also showed OS/2 applications running with their existing DOS products.**

**3Com also debuted two network-administration packages for its new operating system that will use the OS/2 Presentation Manager graphical interface. The \$960 3+ Open LAN View and the \$1872 3+ Open LAN Secure, due early next year, will give network administrators performance statistics and a password security scheme.**

sets them for you. EISA will do something similar with its extension pins, but the old half of the bus will have to sweat it out or fudge it.

Against these points, and others, the EISA club has counter points. Its most

powerful argument, as it sees it, is compatibility. You can't plug today's ordinary disk controllers, mouse controllers, serial port cards, modems and PostScript laser drivers, into the Micro Channel socket. You obvious-

ly would be able to fit them all into tomorrow's EISA sockets.

Speed, it claims, is greater on the EISA bus — a point not accepted by IBM, but not refuted either. This gets complex.

According to Heath, the MCA is designed so it *can* run as fast as 80MHz. What he didn't emphasise (and he should have) was that it has a specification which defines its current speed as 10MHz. That's the speed of the Model 50.

By contrast, the EISA bus is intended to run at over 30MHz. Admittedly, most of today's cards won't be able to keep up — they fall over around 10MHz — but the new ones will be faster.

Heath hinted that IBM's policy is 'not to comment on unannounced products' and so he declined to mention any possible speed upgrades for MCA. Sources tell me of a 40MHz implementation in IBM's laboratories, but these are sources who have been right as often as wrong.

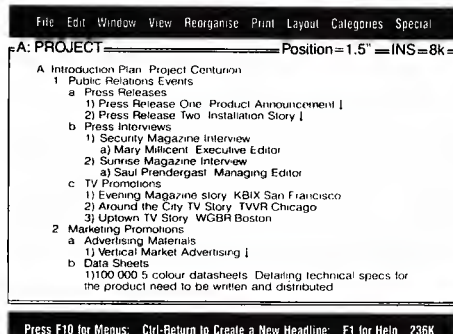
The second big asset for EISA is support. A long list of people, from AST through Intel and Hewlett-Packard, plus Olivetti, Apricot, Wyse and Zenith, have announced plans to produce EISA bus machines. But tackled individually, a lot of these companies expressed no great enthusiasm.

Apricot signed a declaration of support which Compaq could have done without. "If it becomes a standard, we will support it — but we do not expect it to become a standard," Apricot said.

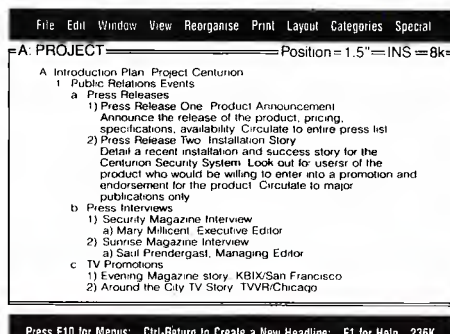
Many others made similar back-peddling noises when asked when they would launch their first EISA box. "It costs nothing to accept an invitation to lunch," one of them remarked "and if there's nothing to eat, we will go and eat somewhere else."

Olivetti, a major contributor to the EISA concept, according to the original announcement, does not expect a flood of cards that will

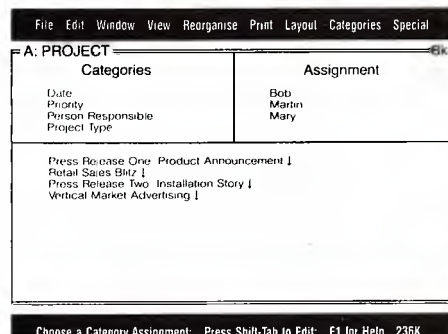
# Manage the big picture? Get Grandview



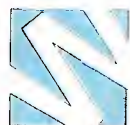
**USE OUTLINE VIEW** –  
to rough out the task.



**USE DOCUMENT VIEW** –  
to write, edit and report



**USE CATEGORY VIEW** –  
to manage the task; to organise  
your data in your own way.



**When  
you're  
working on**

- ▶ Planning Events
- ▶ Tracking their Progress
- ▶ Marketing Plans
- ▶ Proposals
- ▶ Business Reports
- ▶ Delegating Tasks
- ▶ Writing and Research
- ▶ Preparing Scripts and Speeches
- ▶ Organising Schedules
- ▶ Putting together Agendas
- ▶ Searching for information

**use Grandview.**

**p.c extras**

PO Box 136 Redfern NSW 2016  
Phone (02) 319 2155  
Fax: (02) 698 9926  
Melbourne: Phone (03) 486 1999  
PC Extras are the authorised Australasian  
distributors for Grandview.



Grandview is a new class of software,  
for people who have to manage a wide variety of  
activities, people or information. It works, all at  
the same time, as your wordprocessor, outliner  
and database to help with all those "mind  
crowding" jobs you do every day.

It's flexible, so you can enter information  
the way that suits you, then call up real  
organising power. Three views give you the  
insight you need to handle the most complicated  
task. Stand back and view the big picture, then  
zoom in to see the tiny details. Or gather  
particular things you need for a job. All on your  
screen in seconds.

#### Grandview integrates:

▶ **A flexible outliner.** Enter schedules, tasks,  
deadlines, research topics. It's a great way to get  
your ideas or tasks down and turn them into  
organised, action-oriented information.

▶ **A full-featured, easy to use, word-  
processor.** Whether you want to write a memo  
or prepare a laser printed proposal, it does a  
terrific job. A 100,000 word spelling checker is  
built in. Turn any part of your outline and

associated text into presentation quality reports,  
letters, or summaries. Laser and Postscript™ laser  
printers are fully supported.

▶ **An organising Category View.** For instant  
cross referencing. Assign categories, like person,  
project, due date, whatever you need.

If you're a manager or researcher, you'll  
find it easy to delegate or filter information with  
Grandview's Category View. For example,  
Category View lets you gather detailed  
responsibility assignments from throughout an  
outline and show them all together on screen.

You can assign information as you enter it  
in the outline. Or let Grandview make  
assignments automatically for you. View  
information by project, task, person, due date,  
priority, department, or any category you  
choose.

Find out how Grandview works for you.  
Send in the coupon for our "Trial Size" offer. This  
is no "demo disk". We'll send you a complete  
Grandview, minus Save and Print functions, plus  
helpful example files. It's like finding 20 years of  
management experience on a disk!



please  
send me my Trial  
Size copy of  
Grandview and  
the name of my  
nearest dealer.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

POSTCODE \_\_\_\_\_

**\$10.00 enclosed (cheque/money order)**

**RETURN TO: PC EXTRAS, PO BOX 136 REDFERN, 2016**



fit inside it. "It will be a success, no question," said one Olivetti director when I challenged this. "When?" I asked. "I bet you (I added) that in 12 months' time, there are still fewer than 20 cards ready to plug into this extended bus." He laughed scornfully — "Less than 20! No, less than five!"

Which brings me to my main reason for doubting that the EISA concept will ever be a reality: how long before we have EISA machines?

It can't be until the middle of next year, because as of today, nobody has the chips needed to drive the bus. Intel says it is building them, Chips & Technologies says it will too, and Amstrad reckons it will have its own built by July.

It would be unkind to remind Intel, at this point, that it had to withdraw its Micro Channel chips after announcing them because they didn't work, and unfair to suggest that EISA might be every bit as demanding to get right, maybe more so. But there are those who will be unkind, and unfair, and will do so in public, and they will sow doubt and despondency.

By next July, the Micro Channel bus will be over two years old. Today, admittedly, there are no 32-bit Micro Channel cards around, and with the bus still specified at 10MHz, nobody is going to use it for memory expansion for a 25MHz '386. But other expansion cards, 16-bit slot users, are around in large numbers. To give you an idea: in November last year, there were only about 30 cards; by June it was 200; in September, IBM reckoned it was 500.

On top of this growth curve you have to add that the Micro Channel exists, is debugged, and has a large user base. Compaq's own figures suggest 21 per cent of the PC market. I find that figure impressive, especially considering how many of IBM's customers like to have alternative suppliers.



*Large corporate PC network sites have been the cause of many headaches for software suppliers when they order hundreds of copies of a particular package.*

*Tales abound of companies where a single copy of an application is configured and copied, while 99 others sit in filing cabinets, still in their shrink-wrapped coating. Furthermore, there is little control over how many users are simultaneously accessing the program in question. While 100 copies may have been bought, 300 users could be accessing the copy stored on the file server.*

*But now, Australian developer Stein Systems claims to have solved this problem with the release of its Secure Windows utility. The program keeps a count of the official limit of users for each package, and controls access by monitoring network traffic. Once the system limit has been reached, further accesses of an application are locked out until one of the users exits the application.*

*Although the product itself runs under Windows, it controls access to both Windows and non-Windows applications running on the network.*

Over the next six months, not only Apricot, but many of the other EISA 'supporters' will appear in the market with MCA machines. Olivetti has promised one before Christmas and intends to ship. Dell and Tandy, both EISA supporters, are carrying on with plans to make MCA boxes.

Offering customers an upgrade to the AT must be regarded as something that every clone builder should have done ages ago. Who knows? It may even be that in three years' time such machines will be on sale. After all, Amstrad is still selling CP/M machines, Commodore is still selling the 64, and Apple still makes the Apple II and has just

launched a new version of the portable IIc.

But I'm not going to forecast success for EISA just on the basis of the likely survival of the AT market for a couple of years. In a way, it would be nice to establish a market standard that had nothing to do with IBM, which IBM couldn't restrict to 10MHz and then upgrade in a way which killed off any pioneers who had speeded it up in a different way, which IBM is certain to do.

But IBM owns several patents in the EISA bus and is likely to put considerable pressure on trying to collect, if it looks like getting anywhere. And it is unfortunate that many of the AT supporters have, for the past

two years, been saying "You don't need Micro Channel! Heavens, the AT bus is quite good enough for the future!"

Now, they are changing their tune, and the new song sounds like a familiar old number. It is: "Come in Number 80! Your time is up!" Or as John Scully, boss of Apple put it, it's a "great opportunity" for Apple, which he's exploiting as usual by putting prices up.

**Guy Kewney**

## Lotus delays again

The PC industry's most notorious item of vapourware — the legendary Lotus 1-2-3 Release 3.0 — moved yet another step away from reality recently, when Lotus officials announced that the long-awaited upgrade will be further delayed until the second quarter of 1989.

To soften the blow, Lotus in the US announced yet another give-away to new 1-2-3 buyers — Funk Software's Allways, an add-in that brings Excel-like presentation-quality graphics to 1-2-3 worksheets.

Allways brings desktop-presentation capabilities to 1-2-3 by allowing users to format their worksheets with a mix of fonts and point sizes, outlines, boxes and print attributes. Users can also mix spreadsheet data and text with one or more graphs on the same page.

In a half-hearted attempt to justify the delay, Lotus officials said 1-2-3 Release 3.0 has been postponed again in order to fix bugs, improve performance, perfect compatibility with other versions and shrink the code to reduce memory requirements.

When Lotus announced the product in April 1987, officials said it would be shipped in the second quarter of 1988. In March, Lotus promised shipment of version 3.0 by the end of this year.

Sources close to the development project said one of the major factors hold-



# LEGAL POWER

Imagine a computer so small it need never leave your side. Or your front. Powerful enough to hold the facts pertinent to every Larceny case heard over the last 200 years. Small enough to work on your lap in your chambers or in the court room. Placing all the evidence needed in front of the judge and jury.

Power comes from facts and hard evidence. Legal Power. Toshiba T3200. The Toshiba laptop computer that powers verdicts, whatever the court.

**SPECIFICATIONS** • Processor – 80286 CPU running at 12MHz. • Disk Drives 40MB hard disk drive – 720KB PS/2 compatible 3½" diskette drive. • Memory 1MB RAM expandable to 4MB. • Weight 8.5kgs.

## TOSHIBA

**... In Touch with Tomorrow.**



Toshiba (Aust.) Pty. Ltd., 84-92 Talavera Road, North Ryde, NSW 2113. Telephone (02) 887 3322.

Send in now for your **FREE TOSHIBA LAPTOP COMPUTER RANGE KIT**  
Mail this coupon to Free Post 2, Toshiba Laptop Marketing, P.O. Box 350, North Ryde, NSW 2113

Name \_\_\_\_\_ Company \_\_\_\_\_

Address \_\_\_\_\_

Telephone \_\_\_\_\_



ing back the delivery of 3.0 is Lotus's effort to ensure that the program is completely identical to and compatible with 1-2-3/M. the mainframe version of the spreadsheet that will be marketed by IBM.

## Jobs delivers NeXT

Apart from Microsoft chairman Bill Gates' rather disparaging remark that "nobody but Steve Jobs could create quite as much fuss about a monochrome education system," the computer industry was otherwise fairly excited about the launch of the long-awaited NeXT workstation.

With the successes of the Apple II and Macintosh behind him, together with the failures of the Apple III and Lisa, Steve Jobs was once again the centre of the computing world's attention with the launch of his latest pet project. Although it was indeed monochrome, a colour version is due next year, according to Mr Jobs, who launched the system, along with a 400dpi laser printer, at a prestigious San Francisco symphony hall.

Packaged in a slick black magnesium cube and based around a Motorola 68030 CPU, the NeXT box features Mach (an operating system based on Unix System V), a 256Mbyte optical disk, the NextStep graphical user interface and object-oriented applications-development system, seven applications programs, the 17in monochrome monitor, a keyboard and the obligatory mouse.

On top of all this hardware and software, there came a deal: IBM has licensed the machine's interface and applications-development software — NextStep — for use with the AIX operating system, to be offered on RTs and PS/2 Models 70 and 80. From this agreement, NeXT gains credibility and, perhaps, allegiance from independent software developers who may respond to the

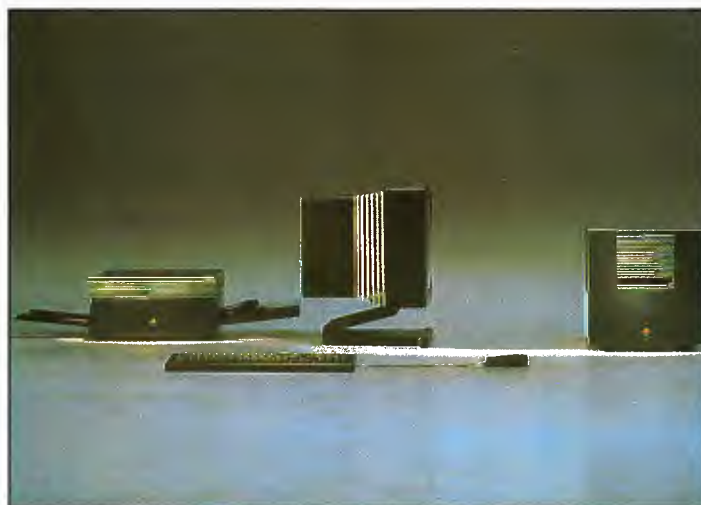
wider market promised by IBM machines.

Software bundled with the NeXT Computer System includes WriteNow, a word processor; Mathe-matica, a mathematics and equation-solving program; the NeXT SQL Database server, developed with the help of Sybase; Allegro Common LISP; Jot, a text database-management application; and a graphical electronic-mail application that offers integrated voice-mail capabilities.

NeXT uses a variety of new and impressive technologies in a package that sports a minuscule footprint and a high level of custom very large-scale integration (VLSI) chips. It puts several coprocessors, the read/write removable optical disk, a digital-signal processor and other hi-tech features into 45 chips, not counting the RAM.

The most important part of the machine, however, is what NeXT calls 'the mainframe on two chips'. This chip set provides full and independent bus I/O processing, and controls parallel and serial port I/O, disk I/O, sound I/O and network and digital-signal processing. The latter takes the pain out of developing a variety of functions, such as graphics, voice, music and fax. This I/O coprocessing power means that the main 68030 CPU can focus on key computing tasks most of the time, and not have to support most of the I/O processes. The network connection is the first to use a 32-bit path for hooking up to Ethernet networks.

The bad news is that Steve Jobs is adamant about only marketing his \$US6500 new toy to the academic community, and has little apparent interest in sales to overseas countries such as Australia. This has led to the suggestion that this first NeXT machine is a 'dummy' system intended to test the market and start developers creating software, with a



Is Next Steve Jobs' 'toe in the water'?

cheaper 'breakthrough' system coming later on for the Rest Of Us.

## Risc worth waiting for

It's going to be a hard six-month wait for the British manufacturer Acorn to release its new Risc Operating System, which I saw demonstrated several weeks ago. If it works the way the demo did, it gives full multi-tasking and, even more importantly, sets up the Archimedes desktop as a new 'standard' in user interfaces. Meanwhile, we can amuse ourselves with the Acorn low-cost Unix machine which is due out soon.

The development team says the Acorn box is very, very nearly ready, even to the point where they are fixing the price. A box with a 50Mbyte hard disk, 4Mbytes of RAM (a standard 400 Archimedes box, in hardware terms) will cost around £4000, including Unix. What that translates to in Australia is anyone's guess. The people most likely to produce a good guess are at the Australian distributor, Barson Computers, but they're not commenting.

The Unix version will be pretty unexceptional — that is, just what you want. It will be Berkeley 4.3 with system V extensions. For those who

want Unix, that will be fine. The rest of us can sigh and wait for RiscOS.

For those familiar with the Mac, there will be some confusion initially with RiscOS. It isn't quite object-driven, but it's very like it. To run a word processor, you take a text file and put it in the application icon. If you put it in a database icon, the database will do its best with it.

Acorn expects to ship the product with several Acorn-written applications which show how to use the multi-tasking in a co-operative way without holding each other up.

The software is now virtually ready. Unfortunately, it fits in 4Mbit ROM chips (half a megabyte of code) which won't be ready to ship until April. The good news is that software developers can get samples from December, or even earlier.

If someone in the US or Asia would license the design and launch it as their own, then we could get really excited about this beast. It really is *fast*: the demos of Archimedes hardware and software were astonishing. For example, Acorn demonstrated the machine running *two* copies of the game Zarch, each in a small window of its own, on-screen with three real-time clocks and one or two other utility programs — all actually live on the display. And you could

All prices  
include sales tax

"The Australia-wide mail-order  
software and board supplier for  
computer professionals . . ."

**PROGRAMS**

**PLUS**



Desklinc  
**\$269**

Sprint  
**\$289**

**Specials**

EGA Paint RIX 2005  
**\$199**

Instaplan  
**\$299**

Quattro  
**\$299**

Quick Basic  
**\$109**

Quick C  
**\$109**

Turbo Pascal  
Toolboxes from  
**\$29**

Turbo Pascal V4.0  
**\$119**

|                           |       |
|---------------------------|-------|
| @Base                     | \$369 |
| @Liberty                  | \$279 |
| Above Disk                | \$179 |
| Ask Sam                   | \$599 |
| Autosketch                | \$149 |
| Brooklyn Bridge Unlimited | \$229 |
| Byline                    | \$499 |
| C Asynch Manager          | \$379 |
| C Compiler (MS)           | \$599 |
| Carbon Copy Plus          | \$295 |
| Carousel                  | \$169 |
| Chart (MS PC)             | \$460 |
| Clipper Compiler          | \$799 |
| Compucard                 | \$129 |
| Concurrent Dos XM-3user   | \$399 |
| Copy AT II PC             | \$159 |
| Copy II PC                | \$89  |
| Copy II PC D/L Opt. Board | \$249 |
| Copywrite                 | \$79  |
| Crosstalk Mk4             | \$349 |
| Dac Easy Accounting       | \$199 |
| Dan Bricklans Demo II     | \$399 |
| Dataease                  | \$999 |
| dBase III Plus            | \$795 |
| DBXL Diamond              | \$299 |
| Design CAD 3-D            | \$599 |
| Desqview                  | \$199 |
| Disk Optimizer            | \$149 |
| Disk Technician           | \$169 |
| Dos Mate                  | \$95  |
| Dos Merge 286             | \$399 |
| DS Backup Plus            | \$169 |
| DS Optimizer              | \$169 |
| DS Recover                | \$89  |
| Duet                      | \$149 |
| Eureka: The Solver        | \$199 |
| Excel PC                  | \$699 |
| Fast Forward              | \$89  |
| Fastback Plus             | \$229 |
| Flight Simulator (MS)     | \$85  |
| Formtool                  | \$249 |
| Foxbase + (Multi-user)    | \$695 |
| Foxbase + 386             | \$669 |
| Foxbase + U/L Runtime S/U | \$649 |
| Foxbase + V 2.1           | \$560 |
| Freelance Plus            | \$699 |
| Gateway V3                | \$149 |
| Gem 1st Word +            | \$399 |
| Gem Desktop Publisher     | \$495 |
| Gem Draw Plus             | \$450 |
| Gem Graph                 | \$425 |
| Gem Presentation Team     | \$799 |
| Graph 3-D                 | \$199 |
| Graph-in-the-Box II       | \$199 |

|                                |        |
|--------------------------------|--------|
| Grasp                          | \$279  |
| Hal                            | \$209  |
| Hardcard Plus 40Mb             | \$1550 |
| Harvard Graphics               | \$629  |
| Harvard Total Project Manager  | \$769  |
| Hot!                           | \$249  |
| Hyper-512 MF                   | \$599  |
| Hyperace 286 Plus              | \$679  |
| Hyperace 286 Super Plus        | \$995  |
| Hyperformance 12.5 MHz         | \$1299 |
| Instaplan (IPT)                | \$344  |
| Instaplan (IPTN)               | \$459  |
| IZE                            | \$699  |
| Javelin +                      | \$429  |
| JT Fax                         | \$750  |
| Lahey Fortran Personal Edition | \$169  |
| Laplink                        | \$229  |
| LePrint Extended               | \$649  |
| Lettrix                        | \$169  |
| Logitech Bus Mouse             | \$179  |
| Logitech Serial Mouse C7       | \$179  |
| Lotus 1-2-3                    | \$595  |
| Lucid 3-D                      | \$249  |
| Mace Plus Utilities            | \$169  |
| Macro Assembler (MS)           | \$229  |
| Magic Mirror                   | \$149  |
| Math Cad                       | \$599  |
| Math Co-processor 80287/8      | \$525  |
| Memory Mate                    | \$109  |
| Modula 2 Compiler Pack         | \$199  |
| Mouse (MS) Serial or Bus       | \$199  |
| Mouse Mat (Pack of 1) (MS)     | \$12   |
| Mouse Perfect                  | \$99   |
| Mouse/Windows (MS PC)          | \$299  |
| Multimate Advantage II 1.0     | \$679  |
| Multiplan (MS)                 | \$369  |
| News Master II                 | \$129  |
| Norton Commander               | \$119  |
| Norton Editor                  | \$190  |
| Norton Guide                   | \$132  |
| Norton Utilities 4.0           | \$125  |
| Norton Utilities Advanced      | \$199  |
| Note-It Plus                   | \$99   |
| Noteworthy                     | \$149  |
| Pageview                       | \$79   |
| Paradise Autoswitch 480 EGA CA | \$499  |
| Paradise EGA Monochrome        | \$479  |
| Paradox 2.01                   | \$999  |
| PC Alien                       | \$89   |
| PC Mos 386 Single User         | \$399  |
| PC Outline                     | \$149  |
| PC Paintbrush Plus             | \$279  |
| PC Tools Deluxe                | \$139  |
| Perfect Exchange               | \$159  |
| Polyboost 2                    | \$149  |
| Print Master Plus              | \$99   |

|                                |              |
|--------------------------------|--------------|
| PrintQ                         | \$199        |
| Print Shop                     | \$99         |
| Project (MS)                   | \$649        |
| Publishers Paintbrush          | \$399        |
| Q & A V3.0                     | \$579        |
| Q&A Write                      | \$285        |
| Qdos II                        | \$99         |
| QEMM 386                       | \$109        |
| Quicksilver Diamond            | \$799        |
| Rbase System V Graphics        | \$449        |
| Reflex Workshop                | \$99         |
| Reflex: The Analyst            | \$199        |
| Right Writer                   | \$179        |
| RM Fortran                     | \$899        |
| SCO Foxbase 286 Dev Sys        | \$1725       |
| See More                       | \$149        |
| Sidekick Plus                  | \$265        |
| Sideways                       | \$110        |
| Silverado                      | \$249        |
| Smartkey                       | \$99         |
| SPF/PC V2.0                    | \$399        |
| Spinrite                       | \$149        |
| Spreadsheet Auditor            | \$229        |
| Sprint                         | \$289        |
| SQZ Plus                       | \$149        |
| Supercom Executive             | \$199        |
| Superkey                       | \$149        |
| Symphony                       | \$949        |
| T-Debug Plus                   | \$169        |
| Take Charge                    | \$169        |
| Timeline V2.0                  | \$635        |
| Timeline V3.0                  | \$999        |
| Tornado                        | \$219        |
| Tracker V2.0                   | \$179        |
| Turbo Asynch Plus              | \$299        |
| Turbo Basic                    | \$139        |
| Turbo Basic Toolboxes          | \$149        |
| Turbo C                        | \$139        |
| Turbo C Tools                  | \$325        |
| Turbo Extender                 | \$199        |
| Turbo Lightning Word Wizzard   | \$99         |
| Turbo Power Utilities          | \$229        |
| Turbo Prolog Toolbox           | \$129        |
| Type Quick                     | \$99         |
| Ventura Publisher              | \$1299       |
| VP Planner Plus                | \$229        |
| Windows (MS) 286               | \$199        |
| Windows (MS) 386               | \$295        |
| Word (MS PC)                   | \$569        |
| WordPerfect 5.0                | \$629        |
| Wordstar 2000 Plus Release 3.0 | \$549        |
| Works PC                       | \$290        |
| X-Tree Pro                     | \$179        |
| XYWrite III Plus               | \$599        |
| and much more . . .            | <b>Phone</b> |

## NEW RELEASES!

|                             |        |
|-----------------------------|--------|
| Agenda                      | \$579  |
| Colorix VGA Paint           | \$299  |
| Framework III               | \$969  |
| Venturer 2.0                | \$Call |
| dBase IV                    | \$Call |
| Turbo Pascal 5              | \$Call |
| Who-What-When               | \$Call |
| Wordstar Professional Rel 5 | \$499  |

**Programs Plus**



**(08) 326 1313**

8/230 South Rd, Morphett Vale, SA 5162

PO Box 80, Morphett Vale, SA 5162

Fax: (08) 326 1644

- \* All prices **include** sales tax.
- \* Australia-wide delivery.
- \* Phone us first for any item.
- \* Special government list-phone.
- \* Dealer enquiries welcome.



MasterCard

All prices subject to availability E & OE.

APCW 10.17.88



resize any window while they ran. OK, so the games demand an awful lot of machine cycles and so they were slow and clunky, but you try doing the same on any other machine in the world.

## Pirates in space

Starglider 2 is certainly going to go down as one of the great games of the year, but it might also be famous one day as one of the most pirated games.

Behind its release can be heard more than one or two squabbles.

The first mystery: the disk on which the first version of Starglider 2 appeared was virtually uncopyable, but pirated versions outnumbered authentic ones. Why?

Next mystery: the game was on sale for over two months in the US before it appeared in Australia. Why?

And the third mystery:

many parts of the game are vaguely reminiscent of Elite, the original space-trading game, and yet they seem inferior in execution. How can this be?

It has to be noted that the game has a reputation which exceeds its intrinsic worth. Oh, it's a good game — I've played it for hours — but I've read reviews which put it ahead of Elite, and I'm far from sure of that.

The secret behind Starglider 2 (SG2) is the fascination that graphics have for its creator, Jeremy San of Argonaut. He's been an authority on the Amiga and the 68000 chip inside it since before there were Amigas to play with. And he has some astonishing algorithms.

In particular, you may note that SG2 runs slower on the Amiga than on the Atari ST. This is easily explained — the same disk fits in both machines (which is why it's almost impossible to copy

the disk) — but it astonishes most observers because the Amiga has specialist, high-speed graphics chips. San's explanation: the Amiga blitter is actually slower at three-dimensional shape movements than his own 68000 algorithms.

With a programmer like this behind it, it's easy to see why the computer community was fascinated to see the special effects — and the effects really are the main attraction of the game.

When Elite first appeared, San was regretful about its graphics shortcomings and a lot of the Starglider mythology arose because of his determined efforts to improve on Elite. He also expressed himself, at the time, as upset about the failure of Elite as an adventure. It seemed that there was a story there, but all it did was count the number of explosions on-screen. Nothing actually happened.

However, when you start to

construct a space game you quickly realise that the authors of Elite 'patented' various items. For example, in Elite there is an ingenious display which shows where other objects are, in space, even before they are close enough to see. It really works. Another example: flying the craft is terribly difficult, because you really are in space, without up, down, left or right to help you.

San quickly discovered that games which look even a bit like Elite are subject to legal pressure. And good ideas that achieve the same effect are hard to work out. It's a bit like trying to invent a mouse without being able to move your hand on the table — what other method is possible, apart from a touch screen? Precious little.

So you'll find that SG2 has a space-flight system which does have left and right, up and down. It has a navigation system which isn't a patch on

## A Compact Excellence

**LOGI 88**  
**LOGI 286**  
**LOGI 386**



Australia Distributors:

**LOGICRAFT CORPORATION (AUST.) PTY LTD**  
8/32 Spine Street, Sumner Park, 4074 Queensland Tel: (07) 3762733 Fax: (07) 3763998



**OSHIMA COMPUTERS PTY. LTD.**  
56 Burwood Road, Hawthorn, Vic., 3122. Tel: (03) 8196060  
Fax: (03) 8194124

**T. K. ENTERPRISES PTY LTD**  
71 Mountjoy Road, Nedlands, Western Australia 6009. Tel: (09) 3867682 Fax: (09) 3891962

New Zealand Distributors:

**LINGO COMPUTER SYSTEMS LTD.**  
Tika St Parnell. P.O. Box 37-430, Auckland 1. Tel: (09) 379-025 Fax: (09) 379-026

Manufacturer: **LOGICRAFT PRODUCTS MANUFACTURING PTE LTD** 35 Tannery Road, #05-01 Tannery Block, Ruby Industrial Complex, Singapore 1334.  
Japan R&D Office: **LOGICRAFT CORPORATION** 1-18-5 Azumabashi Sumida-Ku Tokyo, Japan.

# Introducing the new generation of XT compatible computers.

**LASER™ TURBO XT**

## LASER TURBO XT/3

Everything you expect from an XT plus a whole host of powerful features that turn this into the most wonderful machine. 4.77/10MHz operation with a 7-segment speed indicator on the front panel. A whole new 102-KEY ENHANCED KEYBOARD WITH A SECURITY-LOCK FEATURE, WITH SEPARATE CURSOR and screen editing keys, with separate numeric keypad and

with 12 programmable function keys. A new stylish flush front panel on the outside and on the inside 640K RAM. OPTIONAL 1MB ON BOARD EXPANDED MEMORY CONFORMING TO LOTUS/INTEL EXPANDED MEMORY STANDARD, giving you a unprecedentedly large worksheet. An expansion with two floppy disk drives and one hard disk drive. Of course, the last VLSI gate array technology can guarantee you the highest degree of integration and reliability for the most demanding user.... Standard XT case model also available.

**LASER™ 286**



**DEALER  
ENQUIRIES  
WELCOME**

**Perhaps the fastest and most powerful AT-Compatible ever!**

- High performance 12MHz 80286 microprocessor.
- Processing speed at 6MHz or 12MHz, switchable at any time through the keyboard or front panel.
- Optional 80287 mathematic co-processor makes LASER 286 to earn more advantage in speed of calculation.
- With 64K bytes BIOS ROM, fully compatible with IBM AT.
- Start with 640K bytes high speed RAM expandable to full Megabyte on board.
- Real Time Clock/Calendar with on board battery back-up.
- Detachable keyboard with 102 keys.
- Key-lock switch for data security.
- Seven expansion slots for add-on cards.
- CGA or HGC or display adaptor
- 7-Segment speed indication
- Also available 10MHz version.

**Kalpine**  
**Enterprise Pty Ltd**

59 Hampton Road Keswick  
Adelaide South Australia 5035

**TEL (08) 297 5705/297 7350**  
**TELEX (08) 82412 KALPIN**  
**FAX (08) 371 1534**

## DISTRIBUTORS:

W.A.: T.K. ENTERPRISE PTY LTD 71 MOUNTJOY ROAD, NEDLANDS TEL: (09) 386 7682 FAX: (09) 389 1962  
A.C.T.: B&L COMPUTING 3 KEMBLA STREET, FYSHWICK TEL: (062) 391070 FAX: (062) 807 459  
N.S.W.: MIDSHIP COMPUTING 78A MARKET STREET, WOLLONGONG TEL: (042) 261 766 FAX: (042) 261 459  
QLD: COMPUTER MAGIC 24 EAST STREET, IPSWICH TEL: (07) 812 1611 FAX: (07) 202 4915  
VIC: OREAD COMPUTING 3/2 SAMADA STREET, FRANKSTON TEL: (03) 783 9912 FAX: (03) 783 9912



the Elite console. And its game is infinitely less complex than Elite's, but much more story-focused.

The question of piracy is easier to explain, technically. Since the game was available in the US, hackers there used a technique which interrupts the processor, saves the contents of memory to disk, and thereby totally avoids the need to either copy the original disk, or use the manual to start it (what word is on page six, paragraph four, word twelve?). Since Australian fans couldn't get the real thing, sales of the pirated version took off like a rocket.

The question really is: why wasn't Starglider available in Australia? — and I have to admit I can't find out. A week before Imagineering finally despatched it to the shops, I could only get a beta test version, with several odd features. Rainbird spoke vaguely about 'production problems', an excuse which didn't seem to satisfy San when I last saw him.

I was also amazed to hear of buyers who were trying to get the Amiga version being turned away by storekeepers who assured them that 'Rainbird says the idea of having one disk for both ST and Amiga is dead'.

The moral of copy protection has never been more clearly exposed. The way to prevent piracy is to make sure that it is easier to buy the game than to steal it.

Incidentally, there is an undocumented weirdo in the game. You are supposed to fly back and forth between the various planets. Ignore this: turn left and head out into open space, using your faster-than-light drive. You'll have to stop to refuel a few times, but eventually you'll leave the Solice system behind. About the time it vanishes at the rear, it will reappear in front of you. You will think, oh, the universe wraps around . . . wrong!

I won't spoil the fun by saying what does happen, but I can tell you that Jeremy



**With more power laptop announcements than any other time in PC history, October 1988 became the Month of the Laptop. Heading up the announcements was the current laptop market leader Toshiba, with two powerful new models.**

**Toshiba claims that its \$7999 T1600 is the lightest 12MHz 80286-based laptop available in Australia. With two battery packs it weighs just 5.2kg, and each 400g pack provides for up to two hours of operation. With 1Mbyte of RAM (expandable to 5Mbytes), a 1.44Mbyte floppy and a 20Mbyte hard disk, the T1600 features a backlit EGA screen that detaches so the system can drive a standard EGA monitor.**

**The more upmarket 8.6kg T5200, which becomes the new flagship for the Toshiba range, comes with a 20MHz 80386 processor, 100Mbyte hard disk, 2Mbytes of memory, and one full-sized and one half-sized expansion slot. The detachable screen is a VGA-compatible gas plasma display, and the \$15,999 T5200 also has a 32k memory cache built in.**

**Toshiba says the T5200 is suitable for use as a network file server, although it is admittedly limited in expansion capability. Perhaps it would be useful from a security point of view, as it could be disconnected and locked away after hours. However, using the same argument, it could also be more easily stolen than a traditional file server!**

San didn't know, and actually disbelieved the story when I told him. He's now frantically examining the code.

**Guy Kewney**

## Shareware battles

Having done my best, I have to report a failure to get the story behind the lawsuit between System Enhancement

Associates (SEA) and Phil Katz, who both wrote very useful utilities for packing large files into a small space.

Any user of a bulletin board will know and use files that have an ARC suffix. It's a convenient way to transmit data from one machine to another, and it was invented by SEA. The trick is to take at least one file, probably several, compress it and add

it to any others to be archived into a single archive file.

For transmission down a line, you can see the advantage of compressing the data — it costs less. Also, since you can send five files as one, you save an awful lot of time not mucking about looking for filenames in between files — time which costs money when you have two expensive modems on two expensive systems.

However, the technology on which it was based is pretty widespread and anybody could have done it. When SEA originally did the trick, it struck Phil Katz that they'd missed several known techniques for compressing data, so he wrote his own archive creation utility and his archive unpacking utility.

Like SEA, he put them on the market as shareware. Unfortunately, he didn't invent his own file structure. He wrote a package which could take SEA archives and unpack them, and a package which created files with an ARC suffix — which the SEA package couldn't unpack.

When Katz did this I felt it was discourteous to users. People were loading .ARC files onto databases, others (who had paid to download the SEA archive program, and some who had even registered as users) were trying to unpack them, and finding that they couldn't. They had to get PKARC.COM first. I'd have been happier if Katz had used a different suffix (say, ARK?) so that users knew which was which.

To my amazement, however, SEA didn't respond by upgrading its package to unpack Katz files. Instead, it sued Katz's company, PKWare, on the grounds that Archive was a trademark. So was the .ARC suffix.

The matter went to court, where it was settled out of court (sorry, but that's what happened) and endorsed by a judge — whereby Katz paid royalties to SEA and agreed to stop selling his

# WHY EASY UPGRADE CURES MOTHERBOARD FIXATION

## CHANGING NEEDS CHANGING ARCHITECTURE

Most computer companies are happy to sell you today's computer to meet tomorrow's needs. Not Skai. With our Privilege series we'll sell an open architecture that allows you to configure your 286 or 386 computer to your precise needs, today and tomorrow.

Now change and upgrade of your processor is as simple as changing a board. Your choice is between 16MHz and 20MHz 80286 and 80386 based CPUs, with 30+MHz waiting in the wings. Doesn't that make other computers look a little old fashioned?

We'll even buy back your Privilege boards when you want to upgrade.\*

## EASY SERVICE

The utter simplicity of processor board replacement means quick low cost servicing. And there's the comprehensive protection of nationwide service cover by Honeywell Bull. Compare our two year warranty of major components with the warranties offered by other makers. See how far into the future they'll take you.



## FUTURE PROOF AND MADE IN THE USA

Our 286 is so fast it challenges rival 386's; even in such power draining applications as CAD/CAM. Our 386 is faster still. But the real beauty of Skai's future-proof architecture is that you buy only the power you require today. High speed 85ns memory on the Privilege backplane saves you the additional cost of a future memory upgrade.

Privilege comes from the USA's Orchid Technology, one of the world's leading manufacturers of personal computer products. Their reputation for quality and reliability is unrivalled.

## PERFORMANCE - A QUICK WORD

Our Privilege 286 clocks 20MHz and our 386 a class leading 25+MHz. High speed RAM with six layer technology guarantees 0 wait state

*\*Offer applies to Privilege boards in working condition up to 18 months from date of purchase.*

operation and sub 9ms hard disk access times take the wait out of heavy tasking. Shadow RAM speeds execution of BIOS and Video ROM while the standard VGA and Designer



*Look behind the salesman's mask*

VGA display capability is both backwards and future compatible. Why wait for our rivals to catch up?

Both our 286 and 386 come standard with productivity software such as Disk Cache, EMS, Print Spool and RAM Disk as well as set-up and diagnostics in ROM. Six spare expansion slots and support for DOS and OS/2, as well as 80287, 80387 and Weitek 1167 co-processors all point to a specification as serious as it is complete. Which leads us to ask, what are our competition asking you to buy?



## WHAT ARE IBM, COMPAQ, N.E.C. & CO. SELLING

What price a badge and a number? IBM and Co. don't have a monopoly on brilliant design and quality. Besides, is now the time to invest in a costly big brand 386? The fact is in many

applications the current hardware is generations ahead of available software. So today's premium priced 386 may at once be more of a machine than you need today, yet less of a machine than tomorrow will demand. Skai gives you flexibility in what you buy today and a window to tomorrow.

## MOTHERBOARD FIXATION

Low end 386 designs from other vendors offer a good looking specification. But looks are skin deep. Their designs mean you're stuck with today's processor power.

And VGA and Hard disk controllers on the motherboard is yet another way of chaining you to the standards of 1988. The Skai advantage is obvious.

From the outset you configure the system you want. Not what some sales team has decided your dollar will buy.

## TRAPPED BECAUSE YOU WERE SCARED OF BEING CAUGHT

The fear of being caught with outdated technology is a trap. Spending more to buy technology you'll "grow into" is crazy. With Skai Privilege you select the system you need now. 286 or 386, the upgrade path means tomorrow is completely open to you.

Skai has changed the rules of the game. Privilege boards rewrite price performance equations, and welcome the future. Why buy a name brand "SX" or settle for any ordinary 286 or 386 clone? For the same price or less you could have Skai Privilege.

**Become one of the Privileged  
Ring Debbie on (03) 537 2722  
For your nearest supplier**

# SKAI

**COMPUTER SYSTEMS PTY. LTD.**

**A Member of the Porchester Group of Companies**  
Corporate Sales Office  
276-290 St Kilda Road, St Kilda, Victoria 3182, Australia  
**PH: (03) 537 2722 FAX (03) 537 2490**



package by January 31, 1989. By then, he hopes, he will have an alternative shareware package.

The action has astonished shareware watchers. Even those who thought Katz was injudicious in using the .ARC extension feel that SEA's action is surprising, and they wonder where it might lead.

For a company to claim that a file structure is proprietary is not unheard of. On the other hand, if MicroPro declared that the WordStar file structure was copyright, and that nobody could write a program which could read WordStar files, the company would lose a lot of sales.

And Lotus, which did its best to keep the 1-2-3 .WKS file format a secret, never opposes people who produce files for Lotus users — for obvious reasons.

If SEA really does insist that only SEA programs are allowed to pack and unpack .ARC files, the only certain

result will be that people will start using an alternative file format.

**Guy Kewney**

## 'Floptical' drives

Thinking about a 20Mbyte hard disk drive? Maybe you should think again. Insite Peripherals based in Santa Clara, California, claims you'll soon be able to get the same capacity on a floppy disk drive — and at the same price. The company hopes to start selling its Floptical disk drive, designed to combine the advantages of optical storage and magnetic floppy-disk technologies, early next year.

Insite's Jim Adkisson, who worked on the original 5.25in floppy disk while at Shugart Associates, says, floppy disk technology has been stagnant ever since Japanese companies took over that market in the early 1980s. "We're not exactly trying to

take on Japan," he said, "but we're bringing back the technology leadership."

The Insite I325 drive will be a plug-and-play substitute for a SCSI-equipped Seagate 225 hard drive, Adkisson said. The difference is that the Insite drive uses removable 3.5in disks that are like IBM's 2Mbyte floppy disks but with optical tracking guides engraved on the disks by laser, pushing the capacity to just over 20Mbytes.

Magnetic floppy disks have a much higher inherent capacity than current floppy disk drives offer. The problem, according to Adkisson, is floppy disk instability: a typical floppy disk has a lot of wobble, which makes it tough for the magnetic heads to track the data on the disk, which thus limits track densities. (A conventional 3.5in floppy disk has only 135 tracks per inch; an optical disk drive, which uses much

more stable media, can have as many as 15,000 tracks per inch.)

Insite's drives solve the wobble problem by tracking the laser-etched track markers with a closed-loop optical servo system. Since the tracks are laser-etched, they can't be accidentally erased — and, unlike some high-capacity floppies, the tracks are soft-formatted, so the disks aren't limited to one kind of magnetic encoding. But Insite says its big breakthrough is the low cost of the tracking head — using an infrared LED instead of a laser to follow the tracks, the head carriage assembly is much less expensive than any of its competitors (about the same as a 20Mbyte hard disk, the company says).

The company designed the drive, Adkisson said, to have the same average seek time (65 milliseconds), capacity (20Mbytes), and price as a SCSI-equipped Seagate

# UNPARALLELED PERFORMANCE! MetaWINDOW POWER GRAPHICS FOR YOUR PC!

**It's  
worth  
looking  
into . . .**

MetaWINDOW provides an expanded set of graphic drawing functions, plus the added functionality and performance required for designing multi-window desktop applications. MetaWINDOW comes complete with language bindings for 20 popular C, Pascal and Fortran compilers, plus dynamic runtime support for over 50 graphics adaptors and input devices.

**microway®**  
SOFTWARE & HARDWARE

292 Chesterville Road,  
Moorabbin, Victoria, 3189  
Telephone: (03) 555 4544  
Fax: (03) 555 9871  
BBS (03) 555 4932

• MicroWay is a registered trademark of Excel Computers P L. MetaWINDOW is a trademark of Metagraphics Corp

## Enhanced Features!

- Create pop-up menus, windows and icons.
- Display multiple bitmap or "filled-outline" fonts.
- Face fonts for bold, italic, underline or strike-out stylings.
- Full "RasterOp" transfer functions for writing, erasing, rubberbanding or dragging: lines, text, icons, bit images and complex objects.
- Auto-cursor tracking
- Pull-down menus
- Pop-up windows
- Comprehensive graphic functions
- Multiple fonts
- Supports IBM's new PS/2 VGA and MCGA graphics.
- NO ROYALTIES!



### MetaWINDOW

Advanced Graphics Toolkit  
4 disks, 3 x 260-page  
manuals

**\$484**

### NEW! - TurboWINDOW/Pascal

All the features of  
MetaWINDOW for Borland  
Turbo Pascal Ver. 4!

**\$308**

### NEW! - TurboWINDOW/C

All the features of  
MetaWINDOW for  
Borland Turbo C

**\$346**

All prices plus Sales Tax



# This advertisement is aimed at the sceptical professional.

## DID YOU KNOW?

Regardless of brand name, almost all microcomputers of the same performance leave the factory at much the same price!

Why then can you pay up to two and three times as much for similar models here in Australia?

Simple: You're paying too many "middlemen" margins!

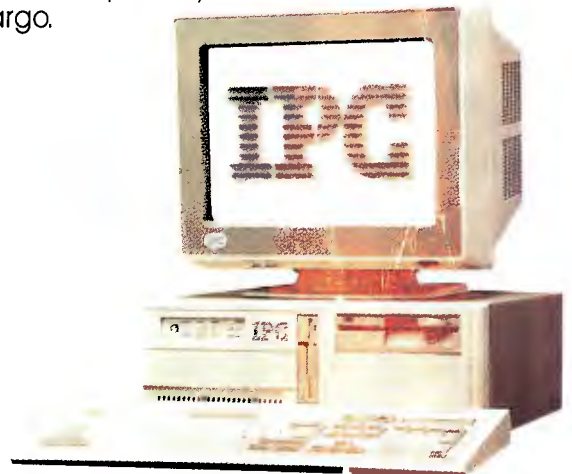
IPC Computers are sold **direct** to the end user: you don't pay the middlemen. IPC Computers? It's a name you probably haven't heard much of — but it's widely established throughout Europe and Asia as a reliable, quality product.

IPC Computers are based in Singapore (not in Taiwan or Korea as many of the "low-end" models are) and have a production capacity of 10,000 computers per month.

In Australia, IPC Computers have chosen COMPUHELP for its experience and its adaptability in meeting the diverse requirements of its customers.

**Direct** selling to you, the customer, also means less delay: your order is faxed immediately to IPC in Singapore, who despatch your configured system by air cargo.

**THIS IS DIRECT!**





# AT LAST!

## A HIGH SPEED FULL FEATURED MODEM YOU CAN AFFORD!

Time costs, so fast, reliable  
communications means  
savings to you.

A new modem has taken the market by storm.

## MAESTRO 2400ZXR

- 2400/2400, 1200/1200, 1200/75, 75/1200, 300/300
- CCITT and BELL Standards
- Automatic Answer/Dial/Disconnect/Baud Rate
- Pulse/Tone Dialling
- Call Progress Monitoring
- Line Condition Monitoring for Reliability
- Full Hayes AT Compatibility
- **PROGRAMMABLE:** Accessible Super8, 20MHz Microprocessor with FORTH Operating System (32K ROM, 8-32K RAM battery backed option)
- RF Shielding metal case enclosure
- Telecom Approved

And **RELIABLE?** Tests have shown that the performance of the 2400ZXR equals or is **BETTER** than any 2400 baud modem currently on the market. We back this up with full 6 month warranty.

Until now a modem like this was usually out of the question - too expensive (\$800-\$1600)

**Our Price: \$396 inc tax**

AND we include a **FULLY SHIELDED DATA CABLE** with high quality connectors **absolutely FREE.**

**FURTHER DISCOUNTS ON TWO OR MORE.**



Dealer Enquiries Welcome  
**(08) 255 0647**  
BANKCARD MASTERCARD  
**LIVING IMAGE**  
BOX 409, ELIZABETH, S.A. 5112  
Warehouse 9, Hewittson Road,  
Elizabeth West, 5112

### ORDER FORM

Please deliver my MAESTRO 2400ZXR and FREE SERIAL CABLE(S) ☐ 9 pin AT ☐ 25 pin XT

Number Needed .....

(Please ring for price of 2 or more)

Enclosed please ring CHQ/MOrder/Bank/Master

#.....for\$.....

(Add \$8.00 for insurance and delivery)

NAME:.....

ADDRESS:.....

## NEWSPRINT



Local distributor InfoMagic has released the Montage Film Recorder, which creates 35mm colour slides and colour print film. After the recorder receives the image, it separates it into its red, green and blue components. Each component is displayed in turn on a high-quality custom flat-field monitor inside the recorder to form a full colour image, then a custom lens focuses the image onto the film. Purity is maintained through the use of special colour filters.

The Montage Film Recorder can handle 16 million colours and full bit-mapped graphics. It has a 4000-line resolution presentation mode and a 2000-line draft mode, and can process an image in around three minutes. The \$12,500 unit supports PostScript and can be connected to either a Macintosh through the SCSI interface or to a PC through a proprietary parallel interface.

225. His plan is to compete head-to-head with 20Mbyte hard disk drives.

Insite has already signed up Kodak and Xidex to manufacture the 1250-track-per-inch (tpi) floppy disks (for about \$10 each). Adkisson said. The company plans to initially sell the drives to OEMs. Quantity prices are "expected to be under \$300," Adkisson said, but the final price will depend on the price of the Seagate 225.

### Bludner

Symantec Utilities for the Mac (SUM), is available from Techflow, tel: (063) 55 1988, not Vaporware, as published in APC's September issue.

Adelaide-based Quercus has recently taken over distributorship of Digital Research products from MicroAustralia. Therefore, Gem Presentation Team is now available from Quercus, tel: (08) 234 1411, not Micro-

Australia as published in the October issue of APC.

### One hundred down, thousands to come

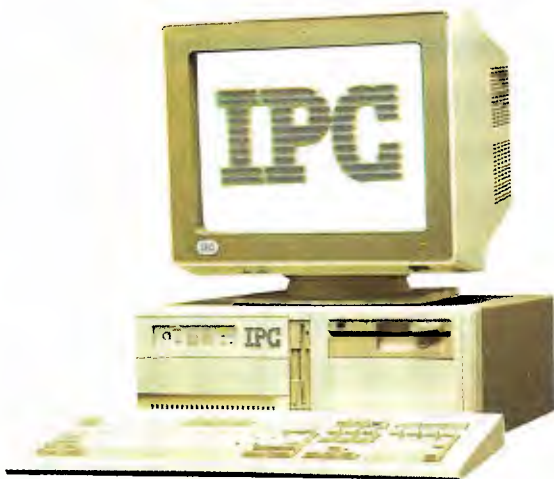
This is the 99th issue of APC. The next issue, our 100th, will be the largest computer magazine ever published in Australia. Along with a collection of what we believe will be some of the best articles published in APC, we'll be presenting reprints of many of the landmark articles and cover stories published over the past 99 issues. Remember the launch of the Sinclair ZX80? What about Apple's Lisa? And how many remember the first issue, back in May 1980 (all 56 pages of it).

We'll also examine the cutting edge of computer technology today and lash out with some predictions of where we, and some industry luminaries, think computer

# Order your IPC direct!

(Professional XT, AT 286, 386 Systems)

# and you'll have the best compatible on the market.



## IPC

### AN OPEN COMPATIBILITY

Most manufacturers claim "Compatible" or "Industry Standard Software". The IPC offers 100% compatibility (we haven't found one software package that won't run on an IPC Computer.).

The IPC readily accepts optional 3½" drives, also ensuring compatibility with the portable and PS/2 range.

Your IPC Computer is supplied with MS-DOS V3.3, GW BASIC and supports XENIX, C-DOS and Prolog.

No matter what your application, your IPC Computer is ready for it!



| MODEL                | CONFIGURATION                                                                                                               | PRICE                                                       |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| <b>IPC XT / FM</b>   | XT Turbo Compact 8088-10/640k RAM/8 Expansion Slots<br>1 Floppy 360k/Parallel — Serial Ports                                | With Hercules Type Card and 14" White Monitor <b>\$1695</b> |
| <b>IPC XT / FE</b>   | Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic                                                                                | With Paradise EGA and 14" Colour Monitor <b>\$2340</b>      |
| <b>IPC XT / 20M</b>  | XT Turbo Compact 8088-10/640k RAM/8 Expansion Slots<br>1 Floppy 360k/20MB Hard Drive/Parallel — Serial Ports                | With Hercules Type Card and 14" White Monitor <b>\$2195</b> |
| <b>IPC XT / 20E</b>  | Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic                                                                                | With Paradise EGA and 14" Colour Monitor <b>\$2895</b>      |
| <b>IPC AT / FM</b>   | AT Turbo Compact 80286-8/12 MHz/640k RAM/8 Expansion Slots<br>1 Floppy 1.2MB/Parallel — Serial Ports                        | With Hercules Type Card and 14" White Monitor <b>\$2395</b> |
| <b>IPC AT / FE</b>   | Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic                                                                                | With Paradise EGA and 14" Colour Monitor <b>\$3050</b>      |
| <b>IPC AT / 20M</b>  | AT Turbo Compact 80286-8/12 MHz/640k RAM/8 Expansion Slots<br>1 Floppy 1.2MB/20MB Hard Drive/Parallel — Serial Ports        | With Hercules Type Card and 14" White Monitor <b>\$2895</b> |
| <b>IPC AT / 20E</b>  | Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic                                                                                | With Paradise EGA and 14" Colour Monitor <b>\$3595</b>      |
| <b>IPC AT / 40M</b>  | AT Turbo Compact 80286-8/12 MHz/640k RAM/8 Expansion Slots<br>1 Floppy 1.2MB/40MB — 40ms Hard Drive/Parallel — Serial Ports | With Hercules Type Card and 14" White Monitor <b>\$3195</b> |
| <b>IPC AT / 40E</b>  | Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic                                                                                | With Paradise EGA and 14" Colour Monitor <b>\$3895</b>      |
| <b>IPC 386 / 40M</b> | 386 Turbo Compact 80386-20 MHz/2MB RAM/6 Expansion Slots<br>1 Floppy 1.2MB/40MB — 28ms Hard Drive/Parallel — Serial Ports   | With Hercules Type Card and 14" White Monitor <b>\$6360</b> |
| <b>IPC 386 / 40E</b> | Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic                                                                                | With Paradise EGA and 14" Colour Monitor <b>\$6995</b>      |
| <b>IPC 386 / 80M</b> | 386 Turbo Compact 80386-20 MHz/2MB RAM/6 Expansion Slots<br>1 Floppy 1.2MB/80MB — 28ms Hard Drive/Parallel — Serial Ports   | With Hercules Type Card and 14" White Monitor <b>\$6950</b> |
| <b>IPC 386 / 80E</b> | Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic                                                                                | With Paradise EGA and 14" Colour Monitor <b>\$7595</b>      |

Other configurations available

All prices include Sales Tax



## The Disk Doctor



**DISK CONVERSION**  
Full format WP conversions a specialty.  
Over 1200 8", 5¼", 3½" & 3" formats.  
All popular packages supported.

**DISK RECOVERY**  
Sector by sector salvages.  
Directories & FATs rebuilt.

**SCANNING**  
Typed documents to disk via OCR.  
All popular WP formats supported.

**DUPLICATING**  
Disks duplicated and verified.  
Labelling & distribution.

**TAPE CONVERSION**  
ASCII, EBCDIC, fixed or variable length.  
7 or 9 track tape and cartridges.  
Tape to floppy or floppy to tape.  
800, 1600, 3200 or 6250 BPI.

**DOCTOR DISK**

Vic: 204 Park St South Melbourne 3205 Tel: 690 9100  
SA: 60 Kensington Rd Rose Park 5067 Tel: 332 2354  
WA: 54 Edward St East Perth 6000 Tel: 328 2011

## 16 MHZ AT 286 POWER

### Micro Arts Announces a 16 MHZ AT machine with up to 8MB of RAM on Board.

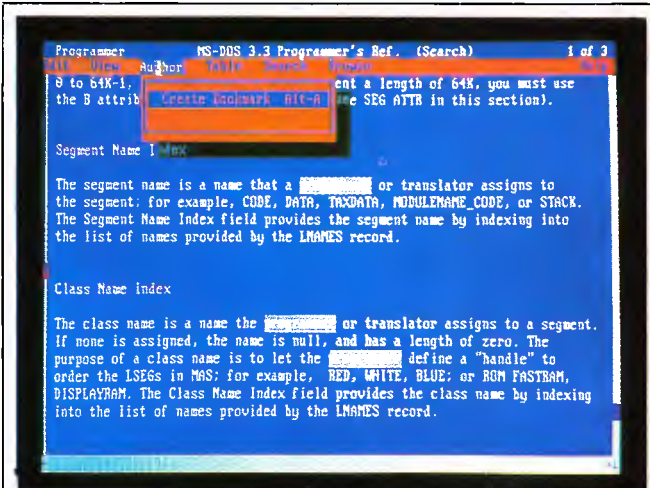
\*16 MHZ AT-286-16 CPU - 1.2MB Floppy Drive -  
42MB voice coil Hard Disk with 1-1 Interleave -  
24MS - Zero wait state - 2 Serial plus 1 Parallel Port  
& 101 Tactile Keyboard. **\$2998**

- \* Multisync Monitor + EGA Card **\$1092**
- \* Multisync Monitor + VGA Card **\$1290**
- \* Micro Arts XT Package including 640KRAM, IFD, 20MD Hard Disk - Key board - Mono Monitor plus National NLQ Printer Complete **\$1995**
- \* Vega VGA Cards **\$544**
- \* 20MB Hard Disk Kits **\$450**
- \* 40MB Hard Disk Kits **\$578**
- \* EGA Monitor + EGA Card **\$898**
- \* Call for prices on 386 Systems Star Printers plus RAM Chips, Coprocessors, and Peripherals.



All prices include tax.

**MICRO ARTS Australia** **650 4711**  
153 Wellington Pde. Sth., East Melbourne. 3002



If you're the type of programmer who spends more time trying to find obscure entries in manuals (or trying to find the books themselves) than writing code, Microsoft has a new product that's designed to make your life easier and more productive. The Microsoft Programmer's Library (MPL) is a CD-ROM that gives you immediate online access to a comprehensive collection of books, technical manuals, and sample programs.

The MPL contains 48 books and technical manuals that are grouped into nine different categories: OS/2, Windows, MS-DOS, C, Basic, Microsoft Macro Assembler, Pascal, Fortran and hardware.

Each category has all the technical manuals for the languages and operating systems, as well as sample code organised into multiple files that are indexed and cross-referenced.

Also included are several books, such as 'Inside OS/2', 'Programming Windows', 'The MS-DOS Encyclopedia', 'Advanced MS-DOS', 'Proficient C', and 'Programmer's Guide to PC and PS/2 Video Systems'.

The MPL is memory-resident, and Microsoft says it's compatible with a wide range of text editors and word processors. You can instantly remove it from memory if you need maximum RAM space for large compiles. To use the MPL, you'll need an IBM PC, XT, AT, PS/2, or compatible with 640k of RAM, a CD-ROM player, and MS-DOS 3.1 or higher. A hard-disk drive is recommended.

Microsoft says a no-charge update will be available in early 1989 that will contain documentation for the OS/2 Presentation Manager and LAN Manager.

As this issue went to press, no pricing details were available. Microsoft is on (02) 452 0288.

technology will be after the next 100 issues of APC. There will be details of the new benchmarks we plan to use in future, plus a chart of how a large number of microcomputers perform under these new tests. (This will include results for the Compaq laptop and the Apricot Qi range, which explains why no benchmark

results are presented in this issue.) Of course there'll be much more, some of which we're still working on.

Don't miss this giant, joint December/January issue of Australia's premier computer publication. It's on-sale on December 14/15 (depending on where you live) with a joint issue price of \$7.95.

END

# Order your IPC direct . . . and enjoy the "TotalCare" Warranty support of Honeywell Bull



## 24 HOUR RESPONSE "TOTALCARE" WARRANTY THROUGH HONEYWELL BULL

### 12 MONTHS PARTS AND LABOUR

Every IPC Computer includes a full 12 months "TotalCare" warranty (parts AND labour) in the price — nothing more to spend!

In the unlikely event that something does go wrong with your IPC Computer, the technical expertise of Honeywell Bull will be at your side!

### MONEY BACK GUARANTEE

We know that some direct order firms have given consumers poor service and, even worse, shoddy merchandise.

That's why COMPUHELP offer a 100% Money Back Guarantee: use your IPC Computer for up to 30 days in your own home or office. We know you'll be delighted with it — but if you're not, you can return it to us for a full refund.

Full details of our 100% Money Back Guarantee are supplied with your computer.

### RELIABILITY

IPC Computers are manufactured with the highest quality components and modules available.

After your order is configured and bench-tested in the factory, it is fully certified with a 48 hour burn-in, with full details recorded by the manufacturer before despatch.

### LIKE A DEMONSTRATION?

Make an appointment to visit our demonstration centre in Sydney. We'll be

happy to allow you all the time you want in "hands on" experience with the IPC Computer of your choice before you place your order.

### NEED TO KNOW MORE?

Send us your business card, or return the order coupon simply marked "more information", and we'll send you a brochure explaining the IPC Computer range much more than we can do here.

In a hurry? Fax (02) 808 3052 or phone us (02) 809 6966 for immediate attention.

### TO ORDER YOUR IPC COMPUTER

Use the coupon (or a photocopy), and send it to us via fax, post or courier. Or, if you wish, phone us with your order.

Payment may be made by any major credit card, cheque, money order or bank transfer (payable to COMPUHELP AUSTRALIA).

### DELIVERY

Delivery of your system will be between 8 and 15 days from date of order, with free delivery in the Sydney metropolitan area. We offer very attractive freight rates to other areas.

### PRICES

All prices shown here include sales tax. Government departments, institutions, other sales tax exempt purchasers or companies wishing to quote a sales tax number may obtain tax-free prices simply by contacting COMPUHELP AUSTRALIA.

| MODEL         | CONFIGURATION                                                                                                                                                                | PRICE                                                |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| IPC XT / FM   | XT Turbo Compact 8088-10/640k RAM/8 Expansion Slots<br>1 Floppy 360k/Parallel — Serial Ports<br>Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic                                 | With Hercules Type Card and 14" White Monitor \$1695 |
| IPC XT / FE   | XT Turbo Compact 8088-10/640k RAM/8 Expansion Slots<br>1 Floppy 360k/20MB Hard Drive/Parallel — Serial Ports<br>Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic                 | With Paradise EGA and 14" Colour Monitor \$2340      |
| IPC XT / 20M  | XT Turbo Compact 8088-10/640k RAM/8 Expansion Slots<br>1 Floppy 360k/20MB Hard Drive/Parallel — Serial Ports<br>Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic                 | With Hercules Type Card and 14" White Monitor \$2195 |
| IPC XT / 20E  | XT Turbo Compact 8088-10/640k RAM/8 Expansion Slots<br>1 Floppy 360k/20MB Hard Drive/Parallel — Serial Ports<br>Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic                 | With Paradise EGA and 14" Colour Monitor \$2895      |
| IPC AT / FM   | AT Turbo Compact 80286-8 /12 MHz/640k RAM/8 Expansion Slots<br>1 Floppy 1.2MB/Parallel — Serial Ports<br>Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic                        | With Hercules Type Card and 14" White Monitor \$2395 |
| IPC AT / FE   | AT Turbo Compact 80286-8 /12 MHz/640k RAM/8 Expansion Slots<br>1 Floppy 1.2MB/20MB Hard Drive/Parallel — Serial Ports<br>Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic        | With Paradise EGA and 14" Colour Monitor \$3050      |
| IPC AT / 20M  | AT Turbo Compact 80286-8 /12 MHz/640k RAM/8 Expansion Slots<br>1 Floppy 1.2MB/20MB Hard Drive/Parallel — Serial Ports<br>Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic        | With Hercules Type Card and 14" White Monitor \$2895 |
| IPC AT / 20E  | AT Turbo Compact 80286-8 /12 MHz/640k RAM/8 Expansion Slots<br>1 Floppy 1.2MB/40MB — 40ms Hard Drive/Parallel — Serial Ports<br>Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic | With Hercules Type Card and 14" White Monitor \$3195 |
| IPC AT / 40M  | AT Turbo Compact 80286-8 /12 MHz/640k RAM/8 Expansion Slots<br>1 Floppy 1.2MB/40MB — 28ms Hard Drive/Parallel — Serial Ports<br>Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic | With Hercules Type Card and 14" White Monitor \$3895 |
| IPC AT / 40E  | AT Turbo Compact 80286-8 /12 MHz/640k RAM/8 Expansion Slots<br>1 Floppy 1.2MB/80MB — 28ms Hard Drive/Parallel — Serial Ports<br>Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic | With Hercules Type Card and 14" White Monitor \$6360 |
| IPC 386 / 40M | 386 Turbo Compact 80386-20 MHz/2MB RAM/6 Expansion Slots<br>1 Floppy 1.2MB/40MB — 28ms Hard Drive/Parallel — Serial Ports<br>Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic    | With Hercules Type Card and 14" White Monitor \$6995 |
| IPC 386 / 40E | 386 Turbo Compact 80386-20 MHz/2MB RAM/6 Expansion Slots<br>1 Floppy 1.2MB/80MB — 28ms Hard Drive/Parallel — Serial Ports<br>Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic    | With Hercules Type Card and 14" White Monitor \$6950 |
| IPC 386 / 80E | 386 Turbo Compact 80386-20 MHz/2MB RAM/6 Expansion Slots<br>1 Floppy 1.2MB/80MB — 28ms Hard Drive/Parallel — Serial Ports<br>Enhanced 102 Keyboard / MS-DOS 3.3 + GWBasic    | With Hercules Type Card and 14" White Monitor \$7595 |

Other configurations available

### TO ORDER:

| MODEL | DESCRIPTION | QTY | PRICE | TOTAL |
|-------|-------------|-----|-------|-------|
|       |             |     |       |       |
|       |             |     |       |       |
|       |             |     |       |       |
|       |             |     |       |       |
|       |             |     |       |       |
|       |             |     |       |       |
|       |             |     |       |       |

COMPUHELP AUSTRALIA — 35-37 Higginbotham Road, Gladesville NSW 2111  
Facsimile (02) 808 3052 Telephone (02) 809 6966

Please debit my (please tick) Bankcard: ☐ Visa Card ☐ Master Card

with the following amount: \$     c   Expiry Date: / /

Card Number

Name

Address

Postcode

Signature

Phone

Delivery Address

Postcode



# **TOSHIBA** **T5100**

## **Portable 386 Power**

- 80386 CPU 16MHz
- 2 Megabytes RAM
- 40MB Hard Disk 29 milliseconds
- EGA Compatible Gas Plasma Display
- Only weighs 6.8Kg, fits in a briefcase
- 1.44MB 3.5-inch floppy
- Serial and Parallel Ports
- Optional 80387 co-processor
- RAM to 4MB
- Supports external EGA Monitor
- Supports external 5.25-inch floppy
- Plug-in 101 keyboard
- 12 Month Warranty
- Ex-stock Availability
- Honeywell Service



**Dicker  
Data**

Dicker Data can provide the complete range of Toshiba Laptops, printers and hard disk drives.  
Ring Fiona Dicker on (02) 525 2122 for Dealer information.



## STATESIDE

*Tim Bajarin, our US correspondent, considers the possibilities for IBM now that it has serious opposition from the clone manufacturers, and looks forward to a group of notebook computers to appear in the next few months.*

### **IBM dominant position in peril**



**The Model 50Z: part of the PS/2 range**

Over the last few months, the world of IBM PCs has taken what could appear to be a step backwards.

IBM's revival of the AT bus architecture, albeit in the PS/2 configuration of a Model 35, set in motion a major move by Big Blue to try to recapture a serious loss in market share since the introduction of the PS/2 eighteen months ago. Before the original PS/2 launch, IBM had a 36 per cent market share in the US. Today, that figure is around 25 per cent, a significant cut in the company's market clout.

This move, coupled with the closing of the highly touted PS/2 manufacturing plant in Boca Raton, Florida, reinforced the view that IBM had made a mistake by moving to a radically new architecture instead of taking the more conservative path of evolving from the AT to

MCA. With these events unfolding, an AT bus consortium, led by Compaq, Intel, Microsoft and eight other traditional PC clone makers, was set up.

This group, known as the EISA committee, is willing to concede that there are some inherent advantages to MCA, but, considering the form factor and designs of millions of existing PC/ATs and '386 ATs already on the market, they think that an upgrade path to true 32-bit bi-directional computing is a smarter design route.

EISA is also sending a message to IBM to the effect that Big Blue's proprietary claims to this design and royalty demands are ludicrous. In fact, folks close to Compaq suggest that the real motivation behind this consortium is to force IBM to get off its high horse about owning all this technology and drop the

royalty scheme altogether.

The real problem this group stirs up for IBM is the fact that without a flock of clone makers doing MCA boxes under licence, the acceptance of IBM's MCA systems will be slowed down.

At the same time, the clone makers who back the AT 32-bit standards which this consortium develops, will find many corporations in their court. These customers like the safe and compatible designs of the original AT and all the upgrades and add-ons that are already on the market.

From a user's standpoint it is easy to ask the question, what is going on here? Was Big Blue wrong and is this grass-roots revolt justified?

To answer these questions best it takes a bit of insight into IBM's thinking about PCs from day one. Remember that IBM is a mainframe and minicomputing company, first and foremost. Last year its revenue was \$55 billion and only \$5 billion of this came from PCs.

When IBM saw the Apple II in the late 1970s it laughed and said it was a toy. But when VisiCalc gave the Apple II a business slant, IBM began to take notice — although it was still a minor consideration.

In fact, when IBM wrote the original business plan for its PCs, it believed that it would only sell 270,000 units during the life of the product. But, what IBM did not count on was the fact that its mere endorsement of the PC with an IBM-labelled product alerted the real business world and the PC really took off. IBM sold those 270,000 units in the first six months, and has gone on to sell an average of at least one million units per year ever since.

When the brains at IBM looked at developing a new PC in 1985, it was decided that a proprietary design

would be in order, and cloning must stop. Although this was a good theory, the fact is that cloning was one of the things that helped make IBM's PCs really successful. In hindsight, it seems clear that IBM did not understand that, but Compaq did.

Less than three months after the PS/2 announcement, Rod Canion, Compaq's president, stuck his neck out and said that the technology upgrade in the PS/2 MCA was marginal, and that the radical design and closed architecture would be a major problem for IBM.

So while IBM adhered to the philosophy that it created standards and would dictate the future PC architecture, millions of users were quite content with the AT and flocked to the clone market in record numbers. Compaq attributes its growth into the billion dollar league to IBM's choice of a radical, instead of evolutionary, power upgrade. And although IBM had noble thoughts in shrinking the footprint of its machines, its restriction of slots for upgrades and add-ons has been a curse, slowing down sales of the models 60 and 70 significantly. Add the fact that the entry level to cloning for manufacturers was very high and you find an inevitable move by many vendors to say 'forget your IBM, let's just extend the AT bus and keep the profits to ourselves'.

So, where does that leave us as users? Well, IBM has too much invested in its MCA programme to back out now. But if it really wants to get MCA accepted as the standard, it must reduce the barriers to entry and maybe even drop the royalty scheme. And it must find a way to give the MCA system, especially the small-footprint Models 60 and 70, a better upgrade path.



**FLAT FOR SALE** Magnificent views from all windows. All mod. cons. EGA higher mode, PS/2, CAD - sheet applications a c



## SKAI PROVIDES THE KEY TO CLEARER VIEWS ON ALL VIDEO STANDARDS

**Flat screen** technology will change your views on computing IDEK Multiflat monitors from Skai, are the latest offering from one of Japan's technological leaders.

**Multi automatic** scanning means full compatibility with all of today's, and tomorrow's video standards. Resolution of up to 1024 x 768 provides startling clarity. The flat square tube virtually eliminates glare. It gives a brighter, clearer picture with no bowed lines. You can draw, or read text right to the corners of the screen without distortion. Without eyestrain.

**14", 15" or 20"** IDEK screens are the automatic first choice of CAD and graphics users. They're a revelation if you run complex windowing and spreadsheet applications.

**Exploit** the brilliance of your IDEK monitor with the ORCHID Designer VGA\* graphics enhancement board. One board which gives you all the graphics modes you'll ever need.



This extraordinary board carries 512K of RAM, supports 3 independent windows with zoom and allows 8 downloadable fonts.

**Desktop** publishing? Phenomenal resolution up to 1024 x 768 means at last you'll see the fine text on your A4 page display.

**CAD** users. With the whole drawing on the screen you can work in programs like AutoCAD or CADKey without tedious zooming. And at 132 columns or characters across the page, WP and spreadsheet users will also see clear benefits.

**Introductory offer.** Until the end of September, we're offering some very special deals on Skai/Idek and Orchid combinations. Monitor and card packages start at around \$1795 inc. tax. Ring us and check them out. Better still, bring your software in and see for yourself. At Skai, the picture for computer users, has never looked brighter.

**SKAI**  
**COMPUTER SYSTEMS PTY. LTD.**

A Member of the Porchester Group of Companies  
Corporate Sales Office  
276-290 St Kilda Road, St Kilda, Victoria 3182, Australia  
**PH: (03) 537 2722 FAX (03) 537 2490**

\*"a stunning new card that picks up where other VGA's leave off." - PC WEEK

Unfortunately, since IBM did not do this from the beginning, and this AT consortium will have a shot at corporate America with a true 32-bit AT, we could see IBM's dominance in the personal computer world continue to decline or stick at a 25 per cent market share.

At the same time, some big questions cloud this EISA standards announcement. The EISA design can only handle chips with processing power up to 35MHz, while the MCA can handle at least 50MHz. And Intel must provide a bridge chip, known as the glue logic chip set. This chip is a critical part of the EISA extension to 32-bit power and Intel may not have it ready for at least a year. IBM will say, rightfully, that MCA is here today with a broad power upgrade path, and EISA is just flogging a dead horse. But these EISA vendors will give the spec free of charge to AT vendors and demand no licence fees. Soon we could have IBM and MCA v 300 AT vendors with their own version of a 32-bit bus.

And IBM has already told vendors of the AT clones who wanted to incorporate MCA that they would have to pay back royalties on their ATs in order to get an MCA licence. So you can believe IBM could sue the EISA group on the issue of proprietary patents and even demand royalties.

The computer world has another series of issues to deal with, making the decision of what PC to buy that will grow with you harder than ever. And it seems clear that IBM's role as the main leader in PCs has hit a snag, and the competition has a great chance to gain on Big Blue.

## No more squinting

If you are a user of laptop computers, you will love a product I have just received for testing. As you know, when you use laptops, especially ones with LCD-based

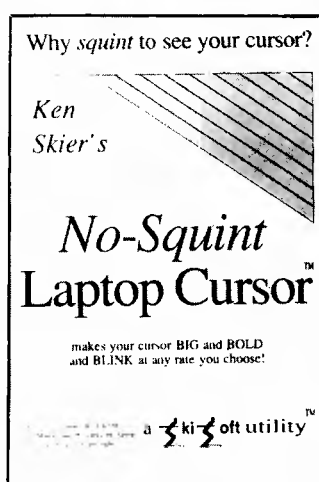
Why squint to see your cursor?

Ken Skier's

**No-Squint Laptop Cursor™**

makes your cursor BIG and BOLD and BLINK at any rate you choose!

a skiSoft utility™



## Save your eyesight with No-Squint

screens, the cursor is very hard to see. In fact, in some lights it is *impossible* to see.

But a developer in Lexington, Massachusetts, decided to do something about this problem, and we now have Ken Skier's No-Squint laptop cursor utility. Ken Skier is the guy who wrote the word processor for the first notebook computer, the Epson HX20, and more recently developed Byline, a DTP product published by Ashton-Tate.

With this utility you can make the cursor as large as any character on your screen, and can control the rate at which it flashes. Now I don't have to search the screen and squint until I finally locate the cursor.

Most laptop users just accept this problem and live with it, but Skier takes problems like this and solves them. Seems like a little problem, but once you use this utility you'll ask yourself how you ever did without it. Since I seem to live on aeroplanes and am forced to compute in the sky, this is a product that makes my working life a little easier. It is available for \$US39 from SkiSoft, Fairlawn, MA, tel: (617) 861 1190.

## The slow revolution

Over the last year or so I have often alluded to a

revolution in PC design that I felt would eventually hit the market. In fact, the launch of the Cambridge Z88 in the UK reinforced my belief that the notebook computer would soon become a mainstream product.

Tandy, with its model 100, actually did a pretty good job in introducing this concept and has sold over 500,000 worldwide to date. But its lack of PC compatibility caused the slow death of this popular model. And, unfortunately, as light and as impressive as the Z88 is, it will also have problems getting worldwide acceptance for the same reason. But by the end of the year we will have at least three very powerful notebook computers on the market, and they will each fit into a standard Federal Express mailing envelope. It is these machines that will set the tone for the new market for notebook computers to develop.

Ironically, the notebook computer is not a new idea. It is actually the brainchild of Alan Kay, a former Xerox PARC employee who, back in 1971, dreamed of a computer that looked like a notebook and had the power of the computers of the day.

This was quite a vision when you consider that the idea of a PC did not even start until 1974 and was not popularised until 1977-78. Unfortunately, until now, the technology has not been available to make this notebook computer. But with new battery designs and sharper low-power screens released of late, we are coming close to realising Alan Kay's notebook dream.

The first model that should hit the market will be from NEC. Rectangular in shape, it has a full QWERTY keyboard and an 80 by 25 column screen and is said to be very light — under 2kg. Also, it uses some radical new small storage drive, making it quite a product.

But sources close to NEC say that it was designed for the high end of the market,

or for the true early innovators demanding a powerful computer but refusing to carry anything weighing over, say, 2.5kg. It will cost around \$US3000 — not a good price for a notebook no matter what it can do.

Another model for release later this year is from Dynabook. This is a small start-up company with a lot of venture capital behind it. The head of the firm, Dan Wilkie, was originally in charge of the manufacturing of IBM's first PC, and later went on to become president of Tandon. He left late last year to start Dynabook and this model is said to be the most powerful of the new laptops in the works. It is also planned to be over the \$US3000 mark.

The third model is supposed to come from Zenith. It is similar to the style of the NEC model, but could come in with a price of around \$US2500. This is better, but still not great pricing for something of this nature.

George Morrow, one of the industry's patriarchs and the designer of the Morrow portable that Zenith first used, says that "in order for the notebook market to take off, it must have a street price of under \$1000." I believe he is right. A notebook computer should be a low-cost item that literally takes the place of a handwriting notebook, and is very versatile.

There are rumours that a small firm in Indianapolis has the real notebook dream machine in the works and could give us the notebook computer that will revolutionise everyone's concept of taking notes in class, business meetings, or anywhere else you have to jot down information.

But it will not be released until later next year, so the early innovators will have to be satisfied with one of the three more expensive models. The rest of us will have to wait for this market to develop and prices to come down.

END



# Compaq SLT/286

*Compaq has finally taken the plunge and launched its first laptop PC. Peter Jackson takes a thorough look at this low-profile heavyweight.*



## BENCHTEST

The one continuing surprise during the so-far-irresistible rise of the Compaq Computer Corporation was that it did not produce a laptop machine to go with its mains-powered portables, and watched a large slice of the portable PC market slide away to competitors like Toshiba. True, the company could — and did — argue that it did not want to produce a laptop with performance traded off against size and weight, but it must have been galling to see giant corporations going to Toshiba for extra portability.

So, despite Compaq's 'we'll never cease to amaze you' slogan, the arrival of the SLT/286 laptop is far from amazing. On the other hand, the new machine has some features that are unusual if not unique; a VGA-compatible LCD display, for example, and a desktop cradle that holds expansion cards and connects to other peripherals while the laptop is on the road. Compaq claims that it was waiting for technology to develop more fully, particularly in displays and battery lifetimes, before launching a design that it has had on the drawing boards for some considerable time. Was the wait worthwhile?

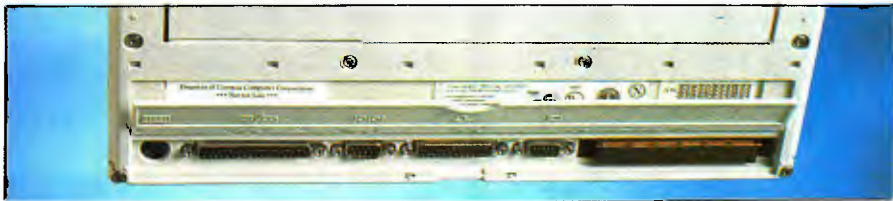
### Hardware

The SLT/286, like Compaq's existing Portable III and Portable 386, follows the lunchbox school of design; the difference is that the lunchbox is much smaller. Closed up for travel, the machine is the same size as a sheet of foolscap paper — the same width as A4 but an inch and a half longer — and just over four inches thick. A short handle pulls out of the centre of one of the long edges, and when this is done the system looks something like a child's vanity case.

However, picking up the box removes that illusion, since the SLT/286 packs over 6kg of mass into its limited volume. A vanity case made of neutronium, perhaps.

The need for that weight is shown by a simple list of the standard hardware included. The SLT/286 has a 12MHz 80C286 processor with 640k of RAM, serial and parallel ports, controllers for 3.5in hard and floppy disk drives, and VGA-compatible graphics hardware built onto the motherboard, and comes as standard with a 1.44Mbyte floppy drive and a 24ms 20 or 40Mbyte hard disk. But as usual with laptops, most of the weight comes from the sizeable rechargeable batteries needed to keep all this hardware going for long enough to be useful.

The front panel has two 3.5in disk bays, one either side of the handle, a



*The large port on the right connects with the Desktop Expansion Base. This replicates most of the SLT/286's ports and houses two 16-bit expansion slots as well as the battery charger*



*As well as showing disk activity and low power, an indicator light shows the machine is powered up in case its power-saving state is mistaken for being switched off*

single push-button labelled Stand By and four indicator lights for power on, disk activity and low-battery warning. At the rear of one side is an input socket for the Compaq mains power adaptor and battery charger and the on/off switch, while the back panel has a neat, hinged

*'On the SLT/286, the hard disk is rarely left spinning aimlessly, and after a short period without being accessed the drive is automatically powered-down.'*

cover that opens to reveal the various input and output sockets.

These comprise a keyboard socket for a full-scale desktop keyboard, using one of Compaq's mini-DIN connectors rather than the more usual maxi-DIN; a standard 37-pin floppy disk connector that can be used for an external 5.25in drive or for a tape streamer; a nine-pin RS232C serial port; a 25-pin parallel port; a 15-pin analogue socket for an external VGA monitor; and, most interestingly, a hefty 96-pin external bus connector.

The external bus connector works in conjunction with the desktop cradle launched with the machine, which is intended to act as a solid base that stays on the desk while the laptop goes with its owner. When the SLT/286 is fitted into

the cradle, this 96-pin connector mates with the cradle and its built-in AT-compatible bus slots, while the other connectors on the laptop also mate with the base and are passed through to sockets on the base itself. This ingenious arrangement means that an external monitor and printer can be plugged into the base, and left on the desk when the laptop is removed without needing to unplug any cables. Also, the two expansion slots in the base can take network and mainframe communication hardware, and again these can be left where they are needed. Remove the SLT/286 from the cradle and it is a laptop; slot it in and it forms the heart of a full desktop machine.

Opening the case using two sliding catches reveals a sandwich structure. The LCD screen folds upwards in Toshiba style, but the central layer of the sandwich is a removable keyboard reminiscent of, but better designed than, the one in the Olivetti M15. This keyboard can be used in place, so that the SLT/286 can be used in true laptop mode, but most users with a larger, flat surface to work on will want to remove it. It has a coiled lead giving plenty of slack to suit different user preferences, and has two rather flimsy-feeling legs that fold down to improve the typing angle.

The keyboard has a 'folded-up' Enhanced layout, made necessary by the restricted width available. The numeric keypad has been incorporated into the QWERTY section, accessed by pressing the usual NumLock key, and the cursor keys are out of the way at the bottom of



## PRINT SHARERS

### IDEAL FOR MULTI-STATION INSTALLATIONS, SHARING LASERS, PLOTTERS AND OTHER PRINTERS.

- MANUAL OR AUTOMATIC
- UP TO 10 COMMUNICATION PORTS, IN OR OUT
- SERIAL, PARALLEL OR COMBINATION
- WITH OR WITHOUT BUFFER
- BUFFER UP TO 2MB
- PRINT DIRECTION CONTROLLED BY KEYBOARD OR POP UP MENU

Prices From **\$108.00** ex. R.R.P.

## BUFFERS

### IDEAL FOR LARGE SPREAD SHEETS, CAD/CAM OR DESK TOP PUBLISHING

- SERIAL & PARALLEL
- UP TO 1MB BUFFER
- MULTIPLE COPY FUNCTION

Prices From **\$357.00** ex. R.R.P.

## PROTOCOL CONVERTERS

### INVALUABLE FOR USE WITH MODEM AND EXTENDED DISTANCE PARALLEL PRINTERS

- SERIAL TO PARALLEL
- PARALLEL TO SERIAL
- WITH OR WITHOUT BUFFERS
- BUFFER 64K OR 256K

Prices From **\$153.00** ex. R.R.P.

## CABLES

### MOULDED & SHIELDED UL - APPROVED DATA CABLES

- PRINTER CABLE
- RS232 & CENTRONICS EXTENSION
- MONITOR & KEYBOARD EXTENSION
- AT CONVERTER (DB9-DB25)
- APPLE MAC
- FLAT RIBBON
- CABLES MADE TO ORDER - SEE OUR ADD IN "MARKETPLACE"

Prices From **\$15.60** ex. R.R.P.  
DEALER ENQUIRIES MOST  
WELCOME

**DUETEK**  
INCORPORATED IN VICTORIA PTY LTD

19 Lacey Street, Croydon Vic, 3136  
Ph: (03) 725 1911: Fax: (03) 725 1126

## BENCHTEST

the board and reduced in size. There are no separate Home, End, PgUp and PgDn keys either in the numeric area or elsewhere, and these commands must be produced by holding down a small Fn key and using the cursor keypad. The Insert and Delete keys are now part of a vertical row at the right-hand side, which also includes PrtScr, Scroll Lock and Pause, while the Escape key and 12 function keys form the top row.

The VGA-compatible LCD screen is respectably sized at 20 by 15cms and is larger than the Macintosh Plus and SE screens, for example. This is something of a leap forward in LCD technology, since the backlit, supertwisted, nematic LCD is capable of the full 640 by 480 resolution of the VGA standard in eight shades or (with a reduced resolution of 320 by 200) 16 shades, software selectable, to match the applications being run. Obviously, given LCD technology, the 16 possible shades are not easily distinguished and most users may well opt for eight shades and the higher resolution unless their applications insist on 16.

Brightness and contrast slider controls are built into the lid under the LCD screen, and the lid itself has a friction hinge that holds it at any desired angle.

Removing the keyboard showed another Compaq innovation. The rechargeable battery pack, using proprietary technology to provide a 'fast charge' feature, is enclosed in a plastic case that snaps into place in a recess under the keyboard. The case is sealed, with just four contacts to connect to the machine itself, and removing and replacing it is a safe and simple job taking just a few seconds. Compaq will sell the packs separately, letting users take one or more fully-charged spare packs on the road.

This move was really necessary because even with all the battery-saving tricks employed, the SLT/286 can still only manage around three hours in typical use, and less when disk-intensive work is being done. Compaq says that this figure is conservative, since it prefers to underestimate the battery life rather than overestimate it, but even so a spare battery pack and charger would be advisable for a full working day away from a mains socket. The charger unit doubles as a mains power supply, so that while it is running the machine direct from the mains it also trickle-charges the battery pack. But strangely, there is no separate charger so you can't charge one battery at the office while using the machine on the road.

As usual with Compaq, the hardware of the SLT/286 is solidly designed, well put

together and ready to ship immediately at announcement. It seems too that the designer who smartened up the appearance of the DeskPro 386s has been let loose on the laptop, since the system is neat, unobtrusive and functional. Whether it can be used by everyone, however, depends largely on its battery life and performance.

None of the hardware in the SLT/286 would be difficult for anyone to build, given mains power to play with. The VGA LCD may be an exception, but on a mains-powered machine LCD technology would not be used in any case; more power-hungry gas plasma or electroluminescent panels would be installed instead. The Dynamac portable version of the Macintosh Plus, for example, with its 640 by 400 display, shows the type of thing that can be done with electroluminescent screens.

But once Compaq had decided to

---

*'... pseudostatic RAM chips are no faster than dynamic chips, but they do consume less power thanks to the on-chip refresh.'*

---

produce a full-function laptop with an 80286, VGA screen and a hard disk all run from batteries, it immediately ran into power consumption problems. The LCD screen is the most obvious manifestation of that, and was chosen because LCD technology, backlit or not, drains much less power than competing flat-panel technologies.

As digital watches have shown, 'passive' LCDs — without backlighting — consume negligible amounts of energy, and although supertwisted nematic LCDs need backlighting to show off their improved contrast, they still require much lower operating voltages and take much less power than electroluminescent and plasma screens. Electroluminescent displays consume 10 watts or more, and plasma panels need 200 volt supplies and drain even more energy.

But the display is not the only power-hungry part of a portable system. The electronic circuitry itself must use CMOS technology wherever practicable, even though CMOS chips have lower device densities, simply because they require less energy to run. The 80C286 processor in the SLT/286, recently released by Intel, is simply a CMOS version of the standard 80286.

# At Last! A New Concept in Computer Product Buying... **VALUE**

## MITAC

Mitac Systems offer: on board video graphics, compact small footprint design, MS DOS 3.3 with GW Basic, Public Domain software, extended keyboards, 12 month warranty.



## TOSHIBA

The Laptop series includes: MS DOS 3.3 with GW Basic, full 12 month warranty.  
• FREE CARRY BAG • FREE TRACKER



## ULTRA

All systems include: MS DOS 3.3 with GW Basic, 12 month warranty, Public Domain software, 10 floppy diskettes, extended keyboards.



### PARAGON XT

|                               |        |
|-------------------------------|--------|
| 40Mb, 360KB FD, Mono.....     | \$2195 |
| 44Mb, 360KB, FD, Colour ..... | \$2495 |
| 44Mb, 360KB, FD, EGA .....    | \$2795 |

### PARAGON 286S AT

|                             |        |
|-----------------------------|--------|
| 44Mb, 1.2Mb FD, Mono .....  | \$3295 |
| 44Mb, 1.2Mb FD, Colour..... | \$3795 |

### PARAGON 286V AT

|                           |        |
|---------------------------|--------|
| 44Mb, 1.2Mb FD, VGA ..... | \$4695 |
|---------------------------|--------|

### TOSHIBA LAPTOPS

|                            |         |
|----------------------------|---------|
| T 1200 FF, 20Mb (XT) ..... | \$5895  |
| T 3200, 40Mb (286) .....   | \$8925  |
| T 5100, 40Mb (386) .....   | \$11025 |
| • FREE CARRY BAG           |         |
| • FREE TRACKER             |         |

### ULTRA XT

|                              |        |
|------------------------------|--------|
| 44Mb, 360KB FD, Mono.....    | \$2195 |
| 44Mb, 360KB FD, Colour ..... | \$2495 |
| 44Mb, 360KB FD, EGA .....    | \$2795 |

### ULTRA 286

|                            |        |
|----------------------------|--------|
| 44Mb, 1.2Mb FD, Mono ..... | \$3295 |
| 44Mb, 1.2Mb FD, EGA .....  | \$3795 |
| 44Mb, 1.2Mb FD, VGA .....  | \$4795 |



Sharing knowledge

#### SYDNEY:

Level 1, 159 Kent Street, SYDNEY 2000  
Ph: (02) 251 7644 Fax: (02) 251 7640

#### MELBOURNE:

20 Lygon Street, BRUNSWICK 3056  
Ph: (03) 387 8833 Fax: (03) 387 2030

#### AUCKLAND:

Level 1, 21 Queen St, Auckland 1, N.Z.  
Ph: (09) 366 0566 Fax: (09) 366 0581



# We're Determined to be A



**SPRINT**  
Word processing so powerful you can customize to suit the style you're accustomed to. Includes user interface program for Word, Wordstar and Wordperfect.

**\$299**



**MICROSOFT QUICK BASIC V4.0**  
From the makers of MS DOS a quick and powerful programming tool.

**\$120**



**NETCOMM MODEMS**  
The full range of Netcomm Modems available including the popular pocket modem.

**\$3**

## GENERAL SOFTWARE

|                                         |             |
|-----------------------------------------|-------------|
| Ability Plus .....                      | \$399       |
| Carbon Copy Plus with Free Viatel ..... | \$280       |
| Crosstalk XVI .....                     | \$215       |
| Clipper Summer 87' .....                | \$850       |
| DBase III Plus .....                    | \$835       |
| Fastback Plus .....                     | \$245       |
| Framework III .....                     | Please Call |
| First Choice V2.01 .....                | \$195       |
| Graphwriter II .....                    | \$755       |
| Gem Presentation .....                  | \$660       |
| Lotus 123 V2.01 .....                   | \$625       |
| HOT .....                               | \$240       |
| Harvard Graphics V2.0 .....             | \$595       |
| Mace Utilities V4.0 .....               | \$170       |
| Multimate Advantage II .....            | \$715       |
| Mirror .....                            | \$115       |
| Norton Advanced .....                   | \$185       |
| Norton Utilities 4.0 .....              | \$125       |
| Norton Commander .....                  | \$105       |
| Paradox V2.1 .....                      | \$955       |
| PC Tools Deluxe .....                   | \$105       |
| Q & A .....                             | \$520       |
| Symphony V2.0 .....                     | \$955       |
| Supercom V3.0 .....                     | \$145       |
| Timeline Project Manager V3.0 .....     | \$915       |
| Ventura Publisher V1.2 .....            | \$1295      |
| Word perfect V5.0 .....                 | \$615       |
| Wordstar Pro 4.0 or 2000+V3.0 .....     | \$495       |
| XTree Pro .....                         | \$190       |

## BORLAND RANGE

|                               |             |
|-------------------------------|-------------|
| Sprint .....                  | \$299       |
| Quattro .....                 | \$295       |
| Sidekick Plus .....           | \$289       |
| Turbo Basic .....             | \$130       |
| Turbo C .....                 | \$130       |
| Turbo Pascal V4.0 .....       | \$130       |
| Turbo Pascal .....            |             |
| Developers Library V4.0 ..... | \$465       |
| Full Borland Range .....      | Please Call |

## MICROSOFT

|                            |             |
|----------------------------|-------------|
| Word V4.0/Pageview .....   | \$695       |
| Mouse Serial/Bus/PS2 ..... | \$230       |
| Windows V2.0 .....         | \$155       |
| Windows/Mouse .....        | \$310       |
| Works .....                | \$305       |
| Quick C .....              | \$120       |
| Quick Basic V4.0 .....     | \$120       |
| C Compile .....            | \$695       |
| Microsoft Full Range ..... | Please Call |

## LASER PRINTERS

|                             |             |
|-----------------------------|-------------|
| OKI Laser 6 Elite .....     | \$3295      |
| Epson GQ3500 .....          | \$2850      |
| Kyocera F1000 or 1200 ..... | Please Call |
| Ultra Laser .....           | \$3395      |

## HARD DISK DRIVES

|                                     |        |
|-------------------------------------|--------|
| Miniscribe 30Mb with cont .....     | \$525  |
| Miniscribe 40Mb V/Coil .....        | \$1050 |
| Nec 44Mb with cont .....            | \$599  |
| Miniscribe 70Mb V/Coil .....        | \$995  |
| Miniscribe 110Mb V/Coil .....       | \$1450 |
| Miniscribe 380Mb V/Coil Esdi .....  | \$4295 |
| Seagate 20Mb with cont .....        | \$495  |
| Seagate 30Mb with cont .....        | \$560  |
| Plus Passport 40Mb .....            | \$2895 |
| Plus Hardcard 20Mb .....            | \$1195 |
| Plus Hardcard 40Mb .....            | \$1495 |
| Control Data Wren II 86Mb V/Coil .. | \$1655 |

- **EVERY HARD DRIVE COMES WITH DATA PROTECTION SOFTWARE**

## PRINTERS/PLOTTERS

|                                       |        |
|---------------------------------------|--------|
| Fujitsu DX2300, 9 pin, 80 col .....   | \$775  |
| Fujitsu DX2400, 9 pin, 136 col .....  | \$1050 |
| Fujitsu DL3300, 24 pin, 80 col .....  | \$1050 |
| Fujitsu DL3400, 24 pin, 136 col ..... | \$1305 |
| Epson LQ500, 24 pin, 80 col .....     | \$760  |
| Star NX 1000, 9 pin, 80 col .....     | \$535  |
| Brother M1709, 9 pin, 132 col .....   | \$950  |
| Brother M1724L, 24 pin, 132 col ..... | \$1295 |
| Roland Plotter, DXY1100 .....         | \$1775 |

**Full range Epson Star, OKI, NEC Printers also available**

- **FREE CABLE & PRINTER STAND**



# The Key to Business Success is Hard Work. And Other Nonsense.

Business success comes from making your money work for you. Not vice versa.

Astute decisions will give you the best tools with the most efficient back-up. Such as a Mitac personal computer from NTA.

A computer is a serious investment. Not just because of cost, but because of the reliance you place on it and the vital data stored within it.

Mitac's range of Paragon desktop personal computers, from the 8088 through to the 286 and 386, have been designed with productivity features hands-on users demand. Such as small footprint to leave your more useable desk space. 386 processing for greater speed and capacity. On board 8088 and 80286 high-resolution graphics. And your choice of 5¼" or 3½" disk drives.

But you must choose your computer supplier as carefully as you choose your computer. The computer business is notoriously volatile. Companies come. And companies go - leaving their clients without essential maintenance and support!

There is one computer supplier who you can trust to be there.

NTA is a new company. However, financially strong, it's run by a team of professionals who have many years of intensive microcomputer marketing and support experience.

NTA's commitment does not end with a purchase. It begins! The company is structured throughout to ensure clients receive on-going telephone support and hands-on maintenance as needed.

So, if you want Mitac computer equipment, at the best price, supported by superb back-up, talk to NTA. The NTA value promise is clear in its prices on the MITAC PARAGON range.

## PARAGON 88 XT

|                                               |               |
|-----------------------------------------------|---------------|
| 44MB HDD, 360KB FDD, MONO 14" MONITOR .....   | <b>\$2095</b> |
| 44MB HDD, 360KB FDD, COLOUR 14" MONITOR ..... | <b>\$2495</b> |
| 44MB HDD, 360KB FDD, EGA 14" MONITOR .....    | <b>\$2795</b> |

## PARAGON 286s AT

|                                             |               |
|---------------------------------------------|---------------|
| 44MB HDD, 1.2MB FDD, MONO 14" MONITOR ..... | <b>\$3295</b> |
| 44MB HDD, 1.2MB FDD, EGA 14" MONITOR .....  | <b>\$3795</b> |

## PARAGON 286V AT

|                                                     |               |
|-----------------------------------------------------|---------------|
| 1MB RAM, 44MB HDD, 1.2MB FDD, VGA 14" MONITOR ..... | <b>\$4695</b> |
|-----------------------------------------------------|---------------|

## PARAGON 386C

|                                                                       |               |
|-----------------------------------------------------------------------|---------------|
| 2MB RAM, 45MB V/COIL HDD, 1.2MB FDD, 3.5" FDD, MONO 14" MONITOR ..... | <b>\$6295</b> |
| 2MB RAM, 45MB V/COIL HDD, 1.2MB FDD, 3.5" FDD, EGA 14" MONITOR .....  | <b>\$6995</b> |
| 2MB RAM, 45MB V/COIL HDD, 1.2MB FDD, 3.5" FDD, VGA 14" MONITOR .....  | <b>\$7595</b> |

Decide Mitac from NTA and let them do the hard work for you.



**DETERMINED TO BE AUSTRALIA'S BEST MICROCOMPUTER MARKETING COMPANY.**

**SYDNEY:** Level 1, 159 Kent Street, SYDNEY 2000 Ph (02) 251 7644. Fax (02) 251 7640.

**MELBOURNE:** 20 Lygon Street, BRUNSWICK 3056. Ph (03) 387 8833. Fax (03) 387 2030.

**AUCKLAND:** Level 1, 21 Queen St, Auckland 1, N Z. Ph. (09) 366 0566 Fax. (09) 366 0581



# er Marketing Company

# KI

# \$3795



## TAXAN 770 WITH VEGA VGA ADAPTOR

More powerful than industry standard offering full 800 x 600 resolution, NEC Multisync II compatibility, analogue and digital facilities - combined with the Video 7 AGA adaptor which comes with a full 5 year warranty.

# \$1850



## OLIVETTI M15 LAPTOP

This Laptop package includes 512KB of RAM, dual floppy (3 1/4"), MS DOS 3.3 with GW Basic, guide to installations, carry case and your choice of our Chief accounting package or Tracker file management software.

# \$1550

## TAPE BACKUP UNITS

|                            |        |
|----------------------------|--------|
| Cipher 5400 60Mb Ext.....  | \$1595 |
| Cipher 5400 60Mb Int ..... | \$1595 |
| Cipher 125Mb Ext .....     | \$2140 |
| Cipher 125Mb Int.....      | \$1795 |

- **FREE CARTRIDGE WITH EVERY TAPE BACKUP**
  - **COMPATIBLE FROM PC/XT THROUGH TO PS/80 SYSTEMS**
- FULL RANGE OF COLORADO, MOUNTAIN TAPE BACKUPS ALSO AVAILABLE**

## GENERAL HARDWARE PRODUCTS

|                                 |        |
|---------------------------------|--------|
| AST Rampage 512K AT .....       | \$850  |
| AST 6 Pak Plus 64K .....        | \$255  |
| AST 5251/11 Plus Local .....    | \$1395 |
| Hyperformance 12.5MHz .....     | \$1395 |
| Hyperam 512k AT .....           | \$750  |
| Hyperace 286 Plus .....         | \$725  |
| Logitech Mouse Serial/Bus ..... | \$165  |
| Logitech HiRez Mouse .....      | \$260  |

**Full range of AST, Intel, Hypertec products available**

## MONITORS

|                                 |             |
|---------------------------------|-------------|
| Nec Multisync II .....          | \$1225      |
| Taxan 770+VGA .....             | \$1850      |
| TVM MD700 EGA 14" .....         | \$865       |
| TVM MD 11 VGA 14" .....         | \$995       |
| Tatung Mono 14" .....           | \$195       |
| Tatung EGA 14" .....            | \$690       |
| Tatung Multisync II .....       | \$895       |
| IPL Range - 2yr. warranty ..... | Please Call |

## VIDEO ADAPTORS

|                              |       |
|------------------------------|-------|
| Vega EGA .....               | \$320 |
| Vega Deluxe .....            | \$495 |
| Vega VGA .....               | \$650 |
| Hercules Graphics plus ..... | \$450 |

**Full range of Everex, Genoa Cards also available.**

## SHIPPING

- Same day delivery metro area - \$20
- Delivery within 24 hours metro area - \$10
- Call for shipping price for country and interstate areas.
- Above prices are applicable for all products except system orders. Please call.

## TERMS

- All prices include Sales Tax.
- Mastercard/Bankcard/Visa accepted.
- Account Customers quote numbers when ordering.
- Personal cheques welcome.
- Prices and availability subject to change without notice.

## I mean Business.

### Please

- ☐ Send me the NTA product catalogue
- ☐ Place me on your NTA Update Data Base
- ☐ Tell me how to buy on credit from NTA
- ☐ Tell me about NTA Corporate Volume Purchase Plan.

Name \_\_\_\_\_

Position \_\_\_\_\_

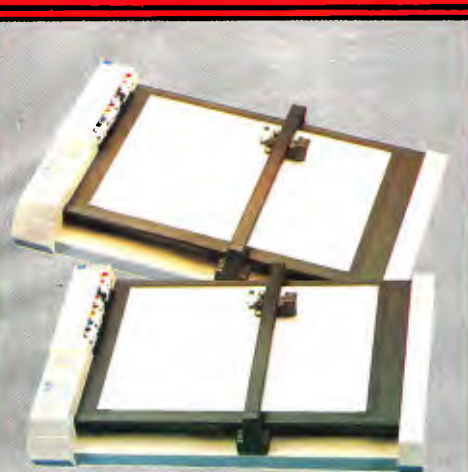
Company \_\_\_\_\_

Address \_\_\_\_\_ Telephone \_\_\_\_\_

Post or Fax to—NTA—at the nearest address.



# Australia's Best Microcomputer



## ROLAND DXY1100 PLOTTER

This is Roland's most popular mid-range plotter.

**\$1775**



**40MB  
HARD DISK DRIVE**  
Comes complete with 12 months warranty and data protection/recovery software.

**\$599**

## OKI LASER PRINTER

This laser gives you full flexibility, including 12 month on-site warranty. Wordstar 2000 plus, P Outline, Showtext and Form Fill.

## INTEL PRODUCTS

|                           |        |
|---------------------------|--------|
| Intel 8087 .....          | \$236  |
| Intel 8087-1 .....        | \$435  |
| Intel 8087-2 .....        | \$335  |
| Intel 80287-6 .....       | \$350  |
| Intel 80287-8 .....       | \$540  |
| Intel 80287-10 .....      | \$645  |
| Intel 80387-16 .....      | \$1050 |
| Intel 80387-20 .....      | \$1550 |
| Above Board 512K AT ..... | \$950  |
| Inboard 386 PC .....      | \$1595 |
| Above Board PS/2 .....    | \$695  |

## NETCOMM MODEMS

|                            |       |
|----------------------------|-------|
| 1200 In Modem .....        | \$395 |
| 2400 In Modem .....        | \$495 |
| 123 In Modem .....         | \$455 |
| 1234 In Modem .....        | \$565 |
| Smart 21/23 SA .....       | \$450 |
| Smart 1200SA .....         | \$520 |
| Smart 2400SA .....         | \$715 |
| Smart 123SA .....          | \$620 |
| Smart 1234SA .....         | \$785 |
| Aut modem 24/24 .....      | \$490 |
| Aut modem 21/23 .....      | \$325 |
| Aut modem 1234 .....       | \$560 |
| Premium Pocket Modem ..... | \$505 |

## OKI PRINTER RANGE

|                                                   |       |
|---------------------------------------------------|-------|
| ML182 - 120CPS, 80 column .....                   | \$395 |
| ML183 - 120CPS, 136 column .....                  | Call  |
| ML192 - 240CPS, 80 column .....                   | \$675 |
| ML193 - 240CPS, 136 column .....                  | \$840 |
| ML390 - 270CPS, 80 column, 24 pin .....           | Call  |
| ML391 - 270CPS, 80 column, 24 pin .....           | Call  |
| ML393 - 450CPS, 136 column, 24 pin .....          | Call  |
| ML393C - 450CPS, 136 column, 24 pin, colour ..... | Call  |

• **FREE CABLE & PRINTER STAND**

CALL OUR CORPORATE CENTRES FOR PRODUCTS NOT LISTED . . . OR COME IN AND SEE US



**Sharing knowledge**

### SYDNEY:

Level 1, 159 Kent Street, SYDNEY 2000  
Ph: (02) 251 7644 Fax: (02) 251 7640

### MELBOURNE:

20 Lygon Street, BRUNSWICK 3056  
Ph: (03) 387 8833 Fax: (03) 387 2030

### AUCKLAND:

Level 1, 21 Queen St, Auckland 1, N.Z.  
Ph: (09) 366 0566 Fax: (09) 366 0581



# Outstanding Paragon Solutions



## Paragon 88 • Paragon 286S • Paragon 286 • Paragon 386

### Mitac Paragon 286V - Takes You Beyond the VGA Standard

When you need state-of-the-art performance and trouble-free compatibility with all the standards, old and new, Mitac's new Paragon 286V is your solution. Switchable 12/8 MHz CPU and optional internal 40 or 100 MB hard disks are just a few of the features you get integrated on this unique micro. With both 5 $\frac{1}{4}$ " and 3 $\frac{1}{2}$ " disk spaces on-board, you can bridge between the standards. And on-board enhanced VGA gives you

16-colour, 800 by 600 resolution and support for all previous graphics standards. A host of other on-board "extras" insures you complete versatility. Whether you use Desktop Publishing, Spreadsheets, LANs, or any of the thousands of other AT-based software packages, Mitac's Paragon 286V is your key to improved productivity.

**NATCOMP**  
TECHNOLOGY  
AUSTRALIA  
Sharing knowledge

**mitac**  
When reliability is a decisive factor

## BENCHTEST

Even with the processor and most of its support chips in CMOS, there are still some tricks that can be used to improve the power consumption figures of the circuitry. For instance, Compaq has used pseudostatic RAM chips for the main memory of the machine; these are dynamic RAM circuits that have additional refresh circuitry built into the chips themselves, and so look like static RAM as far as the outside world is concerned. Static RAM chips are superior to dynamic RAM in terms of power consumption, since refreshing the contents of dynamic chips takes up considerable slices of processor time and uses energy from the power supply to 'top up' the level of each cell. Static RAMs need no refreshing and are much faster than dynamic types, but are also much more expensive. Pseudostatic RAM chips are no faster than dynamic chips, but they

*'At least with the old slow LCDs and processors the text could just about be recognised . . . with the SLT/286 the decision of where to stop scrolling is pure guesswork.'*

do consume less power thanks to the on-chip refresh.

Another power-saving technique employed in the SLT/286 is 'power strobing', cutting the power supply to areas of the system when they are not in use. The system puts the screen and processor to sleep after a preset period of inactivity, maintaining little more than the RAM contents, and only fires them up again when the user needs them. The same applies, only more so, to the hard disk, which is the other major power consumer in the system. On the SLT/286, the hard disk is rarely left spinning aimlessly, and after a short period without being accessed the drive is automatically powered-down.

The choice of hard disk is also significant, since although 3.5in hard disks take less power than 5.25in hard disks, there are variations between manufacturers. Compaq has chosen Conner Peripherals' 20 and 40Mbyte drives because of their small size and weight combined with low power consumption. Interestingly, Conner drives were also often used inside Macintoshes which were not intended to take internal drives, for exactly the same reasons.

Finally, having done everything it could

in design terms to cut down consumption, Compaq decided to make the rechargeable battery packs easy for users to swap in the hope that they would carry a couple of fully-charged spares around with them if they needed extra working time.

However, the limited lifetime claimed for an SLT/286 in typical use shows how far battery, display and disk drive technology still have to go if we are ever to have a full-function battery-powered laptop that can run for a full working day without battery swapping or recharging.

### System software

The operating system supplied with the review SLT/286 was Compaq's standard MS-DOS 3.31, with the modifications that allow volumes greater than 32Mbytes. Of course, that was not necessary for the review system's 20Mbyte drive.

When shipped, the machine will come with a set of Compaq utilities to alter the LCD patterns used for each VGA shade, like those included for the four-shade plasma panels on the Portable III and Portable 386. This software was not available at review time, and neither were any utilities to make use of the extra 384k RAM supplied on the review machine for disk caching or ROM BIOS copying for faster operation, although VDISK.SYS could be used to set up a RAM disk there.

As far as the review machine was concerned, MS-DOS 3.31 was running on a 640k RAM AT with no frills at all.

### In use

The display is always a critical part of any laptop, and the Compaq VGA LCD brings some good news and some bad news. The good news is mainly that its speed, using the 16-bit bus version of the Paradise PVGA1A VGA-compatible graphics chip, would be remarkable for a desktop CRT, let alone an LCD. Compared with a 16MHz 80386 machine running at the test site with either Orchid or AST 8-bit VGA boards installed, the SLT/286 screen won hands down in terms of display speed. Test VGA images that took more than 20 seconds to paint using the Orchid VGA board, for example, took just six seconds on the LCD screen.

The rest of the good news on the display is that it really is possible to run software like Windows 2.03 with 16 shades of grey, although some of the shades are admittedly very close to each other.

The bad news is that the quality of the

## FREE OFFER Accounting Software

Do you have a PC or are you thinking of buying one? So, what are you doing about your accounts?

The share market crash has made businesses even more brutally aware of how vital good accounting and information systems are.

Attaché, the biggest name in PC accounting software, has prepared a demonstration disk that runs just like the real thing. This is your opportunity to examine Attaché in the convenience of your office or home.

We will even include additional information specific to your type of business, size of company and areas of interest. Just tell us what they are.

Simply mail this FREE OFFER coupon today or phone (02) 929 8700. Distributors Australia wide.

# Attaché

*Bullet proof reliability.*

Mail to: Attaché Software Australia Pty. Ltd.  
10th floor, 8 West Street, North Sydney, NSW 2060.

Yes! Please send my FREE Demo Disk and other information about Attaché.

Name .....

Company .....

Address .....

..... P'code .....

Business Phone .....

Type of Business .....

Number of Employees .....

Dealer spoken to (if any) .....

Have PC? Yes/No

Disk size: ☐ IBM 5¼ ☐ IBM 3½ ☐ Apple Mac

Areas of interest (Please tick)

☐ Accounts Receivable ☐ Accounts Payable

☐ Invoicing ☐ General Ledger

☐ Inventory ☐ Payroll

☐ Other .....

Genuine Business enquiries only please.

APC





## 99 Reasons Why You Should Pile Your Advertising Into APC's 100th Issue

... and one more — APC is Australia's top selling computer magazine.

Every month, around 249,000 enthusiasts read APC — and that number will be even higher in December, with the publication of APC's special hundredth issue.

In what will be the largest ever Australian computer publication — both in terms of issue size and print run — APC will cover the history of microcomputing, look at state of the art PC technology and present a vision of what's in store for PC users in the next decade.

This issue of APC is guaranteed to deliver more computer buying decision makers than any other title in the history of Australian publishing.

And you can be part of it by placing your advertisement in the December issue.

Phone Gerard Kohne on (02) 264 1266 or Wendi Fraser on (03) 531 8411 for bookings or more information. There's no time for procrastination — booking deadline is November

Australian  
**Personal  
Computer**

# INFORMATION MANAGEMENT



## NO LONGER A PUZZLE

The text is in an unknown file ... the figures are in another application ... and how can you find that correspondence from a month ago ?

**IZE** lets you put the pieces of the puzzle together.



### RETRIEVAL

Automatically creates outlines of search results . Keyword entries include word groups and phrases.

### MANAGEMENT

Imports information from all popular packages, including keyboard macros, text locking and optional RAM resident operation.

### HOT LINKS

Make IZE a flexible Core application to access and manage information in other applications.

### WORD PROCESSING

Provides powerful features for data entry or for your daily word processing needs.

### IZE makes your PC as versatile and flexible as you are!

Requirements:

IBM PC, XT, AT, PS/2 or compatible. DOS 2.0 or above 512K Ram minimum Hard and floppy disc.



Tell me how **IZE** can save me time when searching for information

Please return to: MICROAUSTRALIA COMPUTER PRODUCTS.

15 McDonald St, Mortlake, N.S.W. 2137 or Ph: 736 3299 Fax: 73 3663

NAME \_\_\_\_\_

COMANY \_\_\_\_\_

POSITION \_\_\_\_\_

ADDRESS \_\_\_\_\_

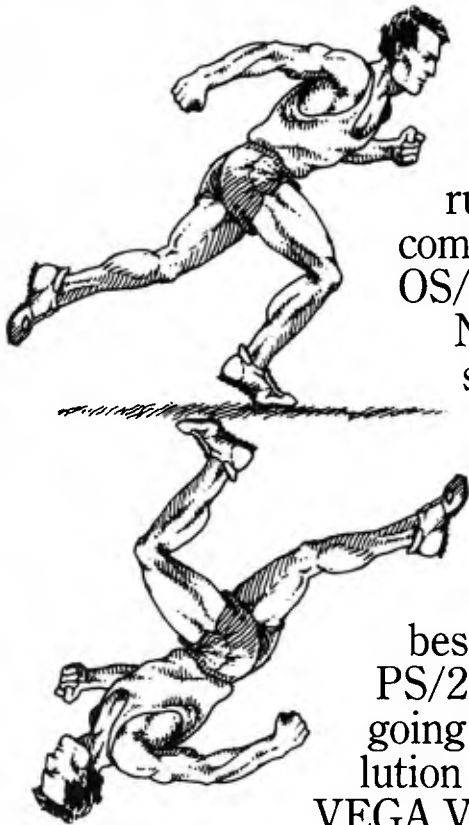
POSTCODE \_\_\_\_\_

PHONE \_\_\_\_\_

FAX \_\_\_\_\_



# How To Run Backwards & Forwards At The Same Time.



If your search for a totally compatible, high performance graphics card has felt a little like going in all directions at once, why not stop and take a breather. Because not only will VEGA VGA run all *current and future* VGA programs, it's also compatible with EGA, CGA, MDA, Hercules and even OS/2. Guaranteed.

Notice we said guaranteed. That's because of one simple fact: VEGA VGA is compatible, on a hardware level, with the IBM VGA. Just the sort of innovation you'd expect from the leader of the pack in graphics technology, Video Seven.

But VEGA VGA does much more than just keep pace with your software. It gives you the best business graphics available, in effect bringing PS/2-level performance to a regular PC. That means going well beyond standard VGA, with 800 x 600 resolution and up to 256 on-screen colors. What's more, VEGA VGA runs on any IBM PC monitor — analog, digital, color or monochrome. Finally, we protect your investment with toll-free technical support and a full five year limited warranty.

So don't wait. Visit your nearest Video Seven dealer today and find out more about VEGA VGA. It could take you in the best direction of all — to the top.

Video Seven Inc., 46335 Landing Parkway  
Fremont, CA 94538. (415) 656-7800.

The following are registered and unregistered trademarks of the companies listed: Video Seven, VEGA VGA, Video Seven Inc., EGA, CGA, MDA, PS/2, OS/2, International Business Machines Corporation, Hercules, Hercules Computer Technology, Inc. Analog monitor needed to support 262,144 palette and 256 colors. Variable frequency monitor required for greater than 640 x 350 resolution. Some restrictions apply to Video Seven warranty and compatibility guarantee. Contact Video Seven for complete details. Video Seven reserves the right to change specifications without notice.

VIDEO  SEVEN  
*We make a clear difference.*

## BENCHTEST

display is really not all that good. The contrast and brightness controls needed careful adjustment to achieve acceptable results, since increasing either contrast or brightness washed out the grey-blue background behind the white text displayed, and any change in ambient lighting conditions required further changes to the settings. The quality was much better in black-on-white applications like Windows, or in Microsoft Word with the screen background set to white, and perhaps Compaq would have done better to reverse-out the display all the time.

In every mode, however, the screen suffers from the usual LCD fault of persistence, meaning that there is a disconcerting blurring effect while typing and a headache-inducing unreadable blur while scrolling. At least with the old slow LCDs and processors the text could just about be recognised as it flowed through the display; with the SLT/286 the decision of where to stop scrolling is pure guesswork.

The keyboard, however, is almost all good news. It is a lightweight unit for obvious reasons, but the keys have good travel and a positive click to them, quite unlike Compaq's other keyboards and many Taiwanese compatibles. One minor gripe is the positioning of the backslash key, just above Enter, which does not match the Enhanced standard and took some getting used to, but in general the keyboard is excellent by laptop standards.

A more serious failing is the fact that the rapid powering-down of the hard disk can cause some delays. For example, after reading a directory listing in MS-DOS, typing another DIR command may well catch the hard disk powered down, producing a delay of a second or two while the batteries rev the drive back up again. Similarly, thinking about some text in Word and then deciding to save it can produce similar delays as the drive gets up to speed to carry out the save command.

On the other hand, the SLT/286 ran every piece of software thrown at it — Word, WordPerfect 5, GrandView, Side-Kick Plus, PC Outline, Windows 2.03 and Excel — and ran them fast. The only problem seemed to be with Traveling Software's DeskLink, used to transfer software from one machine at the review site with the laptop.

Several programs transferred in this way failed to run, showing 'program will not fit in memory' messages implying something wrong with the .EXE files. The cause of this could not be tracked down either to DeskLink or to the SLT/286 by press time.

There are some extra neat features. When the system is entering sleep

# Stop Searching!

FOR PRODUCT INFORMATION  
ALL YOU'LL EVER NEED  
IS IN THE NEW...

## PC INFORM

THE  
COMPLETE  
REFERENCE  
TO HARDWARE  
AND  
SOFTWARE



PC Inform is the most comprehensive register of PC software and hardware ever published in Australia.

Unlike previous attempts to produce such a reference work, PC Inform is not merely a book. It is a computerised product reference system which is updated daily — both by PC industry professionals AND by an independent organisation which monitors all Australian reference data.

PC Inform is segmented by category, with descriptions of almost

6,000 products, including function, manufacturer, distributor, release date and even approximate price. A comprehensive cross reference index, too! PC Inform will be published twice yearly — and a monthly update

service is available as well, to ensure that your copy of PC Inform is always current. PC Inform — the complete PC software and hardware register.

### ORDER FORM

Please send me:

\*4P member — no charge  
No. ....

August issue

\$25

OR One Issue PLUS

Monthly update

service for 6 months

\$50

Freight, handling add

\$2.50

☐

August/March issues

\$40

☐

OR Two Issues PLUS  
Monthly update  
service for 12 months

\$80

☐

Freight,  
handling, add

\$5.00

Please cross cheques and make payable to: "PC Inform". Mail your subscription to:

CIRCULATION DEPARTMENT, PC INFORM  
84 HODDLE ST., ABBOTSFORD 3067.

Enquiries: (03) 419 5300.

• Prices for multiple copies available on application.

I enclose my cheque

OR charge my ☐ Bankcard ☐ Visa ☐ Mastercard

for \$

SIGNATURE: .....

DELIVERY ADDRESS: .....

\*Note: PC Inform included with 1P membership — courtesy of The Computer Trader

KEY NO. INFORM 01



# The Chendai Lap IIIm/IIIIm. It Makes Good Scents! Portability Plus Colour.



**From only \$3,749<sup>inc</sup> tax.**

Don't be thrown off the scent when hunting for a laptop with all the functionality and performance of an IBM deskbound computer. With the Chendai Lap IIIm and IIIIm you definitely have the cunning alternative to desktop computing. Not only are they powerful portable laptop computers boasting a 10 MHz 80186 16-bit processor, backlit supertwist screen, 640K RAM, 20/40 MB hard disk, 5.25" or 3.5" floppy disk drive and built-in modem, they also come with a full size 14" colour monitor to give you dazzling full colour displays. All this at an extremely affordable price!

And if you're not looking for a hard disk system, Chendai has an extensive range of laptops starting off with the Lap Ip, an innovative portable computer featuring one 5.25" plus one 3.5" floppy disk drive. Priced at only \$1,650 inc tax it is possibly the best value laptop around.

**To find out more about the cunning range of Chendai laptop computers contact your nearest Chendai dealer.**

|                              |                   |
|------------------------------|-------------------|
| MELB (03) 663 6509, 699 2000 | QLD (075) 55 1855 |
| 387 8833                     | (077) 21 1250     |
| SYD (02) 261 4411 858 5322   | ACT (062) 73 3544 |
| ADEL (08) 234 0994           | TAS (004) 31 2655 |
| PERTH (09) 227 8952          | NT (089) 81 6100  |

**CHENDAI**  
YOUR BUSINESS CUNNING

Distributed by Quartz Australia Pty. Ltd.,  
109 Drummond St., Carlton South, Vic.  
Telephone (03) 663 6509. Facsimile (03) 662 3871.



## BENCHTEST

mode, it beeps twice and leaves a light blinking next to the Stand By button on the front panel to prevent someone trying to turn a presumably dead machine on and turning it off by mistake. Pressing the Stand By button brings the system back to life. Similarly, a low-battery indicator starts to flash warnings well before the system fails, giving users a chance to save their work before the crash. And although there is no switch that powers the system down when its lid closes, the stand-by circuitry will automatically do the job when on battery power, and on mains power a simple screen blanker comes into play as well.

Overall, the system performed like what it was, a fast AT clone with a fast hard disk. The inevitable compromises involved in any battery-powered laptop are not too obtrusive, and Compaq's battery life estimate looks just about right under this review's rather atypical workload.

### Conclusion

Compaq has introduced this machine, which has by all accounts been in the lab for many months, in response to customers who like other Compaq machines and have been asking for a laptop to go

| Technical specifications |                                                                                                                                           |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Processor:</b>        | 80C286, 12MHz                                                                                                                             |
| <b>RAM:</b>              | 640k standard, expandable to 3.6Mbytes                                                                                                    |
| <b>Mass storage:</b>     | Single 1.44Mbyte 3.5in floppy drive, single 20Mbyte or 40Mbyte hard disk                                                                  |
| <b>Standard I/O:</b>     | One parallel port, one RS232C, external VGA monitor port, external floppy port, expansion bus interface, external keyboard                |
| <b>Expansion:</b>        | Internal: 2400 baud modem, asynchronous communications board and 1Mbyte RAM expansion boards; Via desktop cradle: two AT-compatible slots |
| <b>System software:</b>  | MS-DOS 3.31 with Compaq modifications                                                                                                     |

with them. It is also a machine that gets Compaq into a market that was causing it increasing embarrassment. As usual, the company has done a sound engineering job within the restraints it set itself; no compromise on features and performance, and decent battery life.

However, its competitors are compromising, and finding new markets with 8088 or 8086-based systems with CGA or Hercules LCD screens, and also with longer battery life and much lower price tags. There is even now competition at the high end of the market, with systems like Toshiba's new battery-powered T1600 80286 machine which also has

expansion slots built in instead of in an expensive add-on desk fitting.

Compaq has come into this particular game a little late, but its loyal customers and its name should see it through. Just as the same considerations should give IBM's forthcoming new laptop a chance despite the Convertible's rough landing.

END

*The Compaq SLT/286 costs \$8330 for the 20Mbyte and \$9785 for the 40Mbyte configuration, and will be available from CCA Systems, tel (02) 660 0077 by the New Year.*

# Secure Data

**Cost effective  
PC Data Security  
and a common  
data interface –  
even for Networks**

**NEW!** CUSTOM  
MENU  
SECURE

Custom Menu Secure gives real access control – each user has a personal password and that's all they need. You decide what the user can get access to –

only **\$119.00**

**NEW!** CUSTOM  
MENU  
NETWORK

Custom Menu Network; all the benefits of security but suitable for LAN's –

only **\$295.00**

**NEW!** CUSTOM  
LOC  
SECURITY SYSTEM

The Hardware, a small security board, and The Software to give TOTAL Security for very sensitive areas –

only **\$559.00**

CUSTOM  
MENU  
VERSION II

Where security is not a problem – the totally upgraded menu system so popular among corporate users –

only **\$69.95**

**Ring (03) 882 3246 Fax (03) 882 9215  
for more details and prices of  
Corporate Licences**



**MARTLET SOFTWARE**

P.O. Box 247, Camberwell, Victoria 3124



# The Big Bang Theory.



**In the beginning, there was power.** When Wyse engineers set out to create a new PC family, their objective was not merely to design a new system, but a new *design*. Criterion one was power with total compatibility: higher performance for industry standard software. Today's *and* tomorrow's.

The results are four uniquely upgradeable Modular Systems Architecture™ Wyse PCs that make up the most powerful PC family in the business.

At the top, the new WYSEpc 386 has one of the highest benchmark ratings yet for a personal computer. Our unique design achieves exceptional memory speed as well as processing speed for zero wait state performance on multiple operating systems. Such as MS-DOS®, OS/2™, and Xenix®. For CAD/CAE, heavy duty spreadsheets, or multi-user applications, it delivers power to satisfy the insatiable.

And it's *only* the beginning. Our 8 MHz

*WYSEpc 386 driving our VGA color monitor. Actual screen image.*

AT compatible, 12.5 MHz professional desktop 286, and 12.5 MHz zero wait state 286 provide more power for every level of user.

**Introducing SystemWyse™** Our PCs form the core of a comprehensive system for creating solutions. They link effortlessly with our terminals, monitors, and expansion modules in solutions of exceptional quality and value. And SystemWyse is backed by the company that makes more terminals than anyone but IBM.

SystemWyse. It's a power structure you can build on.

Distributed by: **MPA** Sydney (02) 908 3666,  
Melbourne (03) 894 1500, Brisbane (07) 368 3033,  
and **Imagineering** Sydney (02) 662 7111,  
Melbourne (03) 690 9022, Brisbane (07) 352 5011.

## WYSE

If we weren't better, we wouldn't bother.

Wyse® is a registered trademark of Wyse Technology. SystemWyse, WYSEpc 386, and Modular Systems Architecture are trademarks of Wyse Technology. Other trademarks/owners: MS-DOS®, Xenix/Microsoft, OS/2, IBM/International Business Machines.WYS 3009/R

# Apricot Qi

***The march of technology and innovation has inevitably led to Apricot taking the plunge into the brave new world of PS/2 and its Micro Channel Architecture. Once a victim of standards itself, the company now hopes to set some of its own with the Qi series — Guy Kewney assesses its chances.***

The Apricot Qi series is not 'just another clone' — it is a border post. It marks the point where the micro industry leaves the territory of the PC and moves into the new frontier of the PS/2. Lots of things will be the same, but a lot more will be strange, foreign and hard to understand.

The new machines are innovative in two main areas: they are exclusively '386 machines — something even IBM has not yet had the courage to do — and they are genuine PS/2 clones, with the new PS/2 system bus, the Micro Channel, built in. Even if these boxes were no more than the first PS/2 look-alikes, they'd be pretty special. But Apricot has sought to produce that 'little magic extra' which a clone builder needs, to make sure that people who look at the original IBM machine and the Apricot will say: 'Actually, the imitation is just as good, and has all these neat extras, for less.'

I'm reminded forcibly of the impact the Olivetti M24 had on the PC market when it appeared. This range of machines does all the things the PS/2 range from IBM does, but it also has a 16-bit 386SX box (at the time of writing IBM was expected to announce one, but hadn't), and networking and system security, plus on-board hi-res graphics.





## The system bus

The fundamental innovation is the Micro Channel bus — IBM's innovation, designed to impress the casual buyer with its 'advanced specification' and also designed to impress the reasonably well-informed executive, planning for the future. Several of IBM's major rivals have announced intentions to follow this new standard. Only Apricot has started shipping — or is expected to by the end of November. Dell has decided there isn't enough demand; Tandy has decided to stick with the standard AT bus; NEC has pulled its punch; and Amstrad has gone one better, and promised not to do a Micro Channel design for years. Or at least months.

There are two points about the Micro Channel: one is the technology argument, and the other is the marketing hype. (See the box 'In perspective' for more details.)

## Hardware

All the Qi machines fit in the same uniquely pretty system case. It's a masterpiece of disguise. From the front, it looks like a low-profile box with a little platform to hold the screen. Not until you open the box up do you realise that that little platform is practical — it makes the necessary space for the Micro Channel cards.

Most of the Qi boxes will have the floppy drive on the right, and a tape backup drive on the left. In between are the disk activity indicator, and the infra-red receiver and other indicator lights which look like missing teeth to me, but will no doubt look terribly futuristic and hi-tech to your average buyer.

Behind the case are the connectors and the key — without the key, you can't open the case. This is actually the most important security level, because all other security is wasted if someone can open the box (as is further analysed later).

The keyboard and screen are both styled into the total appearance of the system, and I think nicely so. The keyboard itself is a standard PS/2 design, with the Control and Alt keys back to front and 12 function keys along the top of the keyboard. Apparently, you can plug in an ordinary keyboard, without the nice styling. Despite aesthetics, I'd happily replace the Qi board with an AT board — I get very confused with my Control and Alt keys back to front and no way of switching them.

Screen options include several variants of colour and black-and-white, all styled in the same way and all providing VGA



*The Qi has an advanced security lock controlled by an infra-red electronic key. The system can be locked while the user is absent*

level graphics. At the time the test was carried out, there was no way of assessing the compatibility of this with IBM's own VGA.

The on-off switch is on the right. Describing where it is has evoked several dubious images from Apricot staff. It is invisible. It's underneath the overhang of the rising side. You have to slide your hand gingerly back in an insinuating way until you reach it, and then squeeze. Anyone who can do this without blushing for the first time is either very brash or very innocent.

All the input and output sockets are at the back, which assumes (everyone does this) that you can plug things into the machine by feel. Since everyone does it, you can't deduct points from Apricot for lack of consideration for the user, but surely the time has come to really *think* about cables and microcomputers.

Switched on, the machine is whisper-quiet. The disks murmur, the fan mumbles, and it's a welcome friend in the office.

The standard disk is 3.5in and 1.44Mbytes. An add-on 1.2Mbyte 5.25in design is available. However, the recommended extra peripheral will be a tape backup device.

## Setup

At this stage, there is only one operating system, and it is MS-DOS with Win-

dows/386. This makes startup normally very simple — you switch on. The disk is formatted for MS-DOS and contains all the software — at least, that was the plan as announced by the company's chairman Roger Foster.

The only problems will arise when you decide that you want to use the security pack, which is available as an optional extra. Instantly, you lay yourself open to terminal nervous stress, with the need for master security disks, configuration diskettes, passwords, Qi keys, setup procedures and a safe. For the full horrors of working in a secure environment, see below. I suspect that 90 per cent of Qi users will quietly ignore the security feature, even if their bosses insist they use it. Anyone who wants Qi users to use the full key system will have to set it up for them.

Once it is all installed, however, all you have to do is: a) keep the case locked; b) keep your infra-red security key; and c) remember your password.

In that case, when the machine is switched on it's a simple matter. It boots up, asks you your name, and asks you to press your infra-red remote control. After that, it's a normal PS/2 clone.

At the time of writing, OS/2 wasn't available. Inevitably, a user-friendly startup for this will arise, as with IBM's machines, but most users will not really be interested in this.

We were unable to experiment with a variety of other operating systems for





Warwick V. Hoider National Sales Manager

# "UPTIME : Now in Australia and New Zealand"

**A disk packed with programs for your computer delivered to you monthly.**

You can now build an exciting library of new programs for less than a dollar each. You deserve value and with UPTIME value is yours. Each month over 100,000 people, just like you, around the world enjoy UPTIME. Your disk arrives with eight new programs and more every month...

Be more organised and productive with home and business management programs. Learn with educational programs and adventures.

UPTIME is easy, inexpensive and fun. Too good to be true? Would you believe each monthly disk has reviews of the latest software, hardware and peripherals saving you time and money. Learn the strengths and weaknesses of each item we evaluate. UPTIME disks are available monthly for:

- IBM PC Compatible
- Commodore 64/128
- Apple II Series
- Macintosh

Subscribe now and save. Satisfaction is guaranteed or your money back. Be amazed at just how much comes on every UPTIME disk. So fill in the coupon or for immediate service call toll free:-

## 008 998 208

**QUALITY PROGRAMS  
LESS THAN \$1 EACH**

## NEW

**FOR ALL COMPUTERS**

**I'LL BYTE!** I'm a computer user who wants more. Please start my subscription to UPTIME immediately.

**12** DISK ISSUES \$119 ☐

**6** DISK ISSUES \$65 ☐

**1** DISK ISSUE \$15 ☐



NAME:.....

ADDRESS:.....

.....

.....POSTCODE:.....

STATE:.....

TYPE OF COMPUTER:.....

Payment enclosed (please make payable to UPTIME)

Bill my VISA ☐ MASTERCARD ☐ BANKCARD ☐

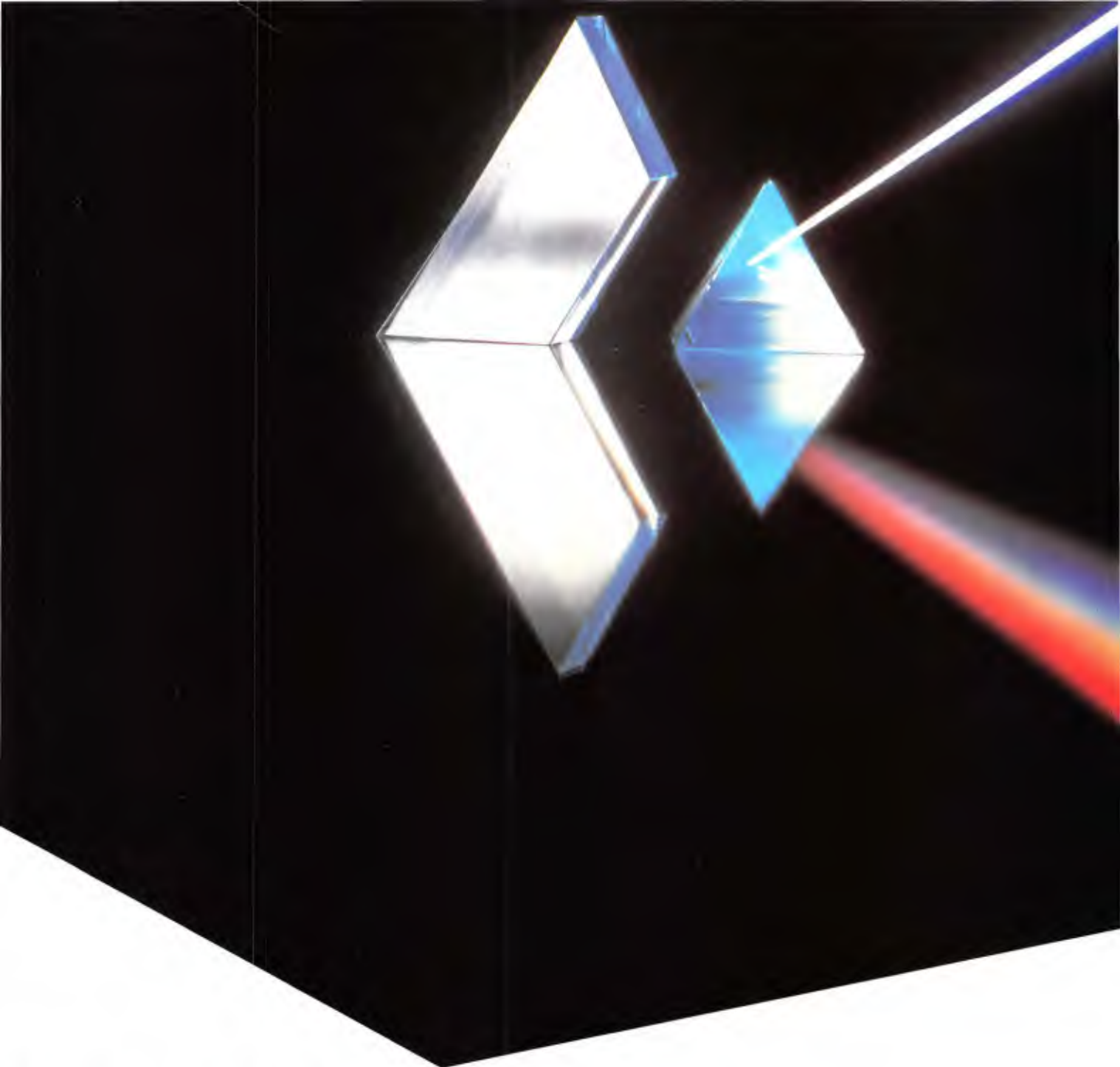
Exp. Date:.....

Signature:.....

Account No:.....

SEND TO: UPTIME, PO Box 829, West Perth W.A. 6005. Phone: (09) 328 1944





## **Building a better standard in computing.**

Acer has transformed its corporate values of quality, innovation, and customer satisfaction into an exciting new spectrum of computer systems.

Acer's worldwide R&D efforts generate the most advanced personal computers to meet your rigorous demands. From high performance entry-level systems to state-of-the-art 386-based and PS/2 compatible personal computers, Acer creates computers to satisfy all your needs. And by building feature-packed products compatible with the industry standards, Acer has become the value leader in the field.

But Acer provides much more than superior personal computers. Acer is your total computing solution. Meeting the connectivity challenge with its local area network, the LAN 30, Acer optimizes your business potential. The LAN 30 gives you an excellent way to share resources between personal computers and make maximal use of peripherals such as the Acer LP-76 laser printer. One of the few companies to provide a one-stop connectivity solution, Acer supplies all the equipment, software, and support you need. In one place. No worries, no sweat.

# Acer. The Spectrum of Value.



Painstaking attention to detail is another Acer value. Thinking small has made us big. Our 500<sup>+</sup>, 1030, and 915 are not only famous for their high performance, but also for their compact footprint. They fit well on your crowded desktop. They fit well in any workspace.

And each Acer computer reflects Acer's consideration for the little things. Little things that make computers more pleasant to use. Little things like keyboards earning universal praise for their nice touch. Little things like easily accessible

front panel on/off switches, and front panel reset buttons.

All these features and Acer's commitment to quality, innovation, and customer satisfaction combine to create systems of unparalleled value. Acer backs up this quality with over 12 years of experience, and a distributorship providing service in more than 70 countries, with over 10,000 dealers worldwide.

Acer Computer systems.  
Based on the right values.

|                                                                                         |                                                                                  |
|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| <b>Acer 1100</b><br>20MHz or 16MHz 386-based supermicro                                 | <b>LP-76</b><br>Laser printer offering true HP LaserJet Series II compatibility  |
| <b>Acer 1030</b><br>Enhanced Model 30 compatible with higher speed                      | <b>LAN 30</b><br>One-stop business connectivity solution                         |
| <b>Acer 915</b><br>Second generation 286-based machine offering total diskette support  | <b>Acer Station 5280</b><br>High performance 286-based diskless LAN work station |
| <b>Acer 500<sup>+</sup></b><br>8088-based entry-level personal computer running at 8MHz | <b>Acer Server 5200</b><br>Powerful 20MHz 386-based LAN fileserver               |

HP LaserJet Series II is a registered trademark of Hewlett-Packard Corp.  
PS/2, Model 30 are registered trademarks of International Business Machines Corp.

**Acer**   
The Word for Value



***"Congratulations. Those  
Polaroid color overheads  
made all the difference."***

*If business presentations today are as stimulating as the movies, it's undoubtedly due to the variety of innovative and colorful presentation aids available.*

*Like Polaroid instant color overhead transparencies, Polaroid 35mm instant slides, and graphics generated via the Palette Computer Image Recorder. Even complex color motifs can be integrated into overhead presentations. It's the most effective way to make sure that your presentation is understood and remembered.*

*All Polaroid films are easy to process and can be quickly converted into presentation materials at the last minute. Even white-on-blue word and graphic slides can be prepared without complicated intermediate stages. The advantages are obvious: you save time and money, have greater flexibility, in-house security, and deliver a more impressive presentation.*

*With Polaroid, a potentially dull address becomes a memorable presentation. And a performance that your colleagues will applaud. Polaroid instant photography is a valuable aid not only in business but also in the fields of science and medicine.*

*If you'd like to know how Polaroid instant pictures can help you make your work easier, simply give us a call on the Polaroid Hotline toll free (008) 22 6785 or 887 2333 for Sydney metropolitan areas.*



 **Polaroid**  
**The professional solution**

Polaroid is the registered trademark of Polaroid Corp. Cambridge, Mass. U.S.A.

Ogilvy MPE 0018R

# BENCHTEST

startup, but did (partially) successfully run DESQview and VM/386 on the SX model — which actually surprised me. But none of the alternatives to MS-DOS 4.0 will allow use of the security system — yet. Users will have to buy versions from Apricot, setup so that they use the Apricot BIOS. When these are available, we'll test them. No date was given.

## Ports/switches

The machine is unique in its market for having two extra sockets on the back — a network port, and a synchronous comms port. The network comes in two forms — a D-type socket and a full Ethernet coax, either of which can connect to an Ethernet standard local network. Literally all that is needed is the cable and the software.

The serial comms COM1 port is there, as standard, in the PS/2 format (the full number of pins, as in the XT, not the 'improved' 9-pin AT configuration!) but the surprise is that there is also a synchronous port.

I have no software that drives the synchronous port. Theoretically, a synchronous modem and a specialised comms program would work, but at the time of doing this test neither was avail-

able, and so we'll just have to assume it works.

The standard asynchronous and parallel ports work as standard. I tested them with some very demanding, badly-behaved software, and they imitated the standard PC architecture perfectly.

This is bound to cause misery. The comms world is currently trying to decide whether IBM deliberately or accidentally replaced the normal PC and AT comms drivers, in its Model 70 and 80 PS/2s, with non-standard chips. IBM is currently equivocating, and software companies are not helping — their stories differ.

In a nutshell, the newer comms chips inside the IBM work fine if you use DOS BIOS routines to drive them, but they don't run at the full speed which the old design would achieve. IBM (naturally) say that people should work through DOS. This would limit most people to 38kbits transmission, a crazy restriction when powerful programs like DeskLink, LapLink and Fastwire II can go at speeds of 119kbits or even faster.

Apricot's decision to stay with the standard must be the right one. Anyone who *must* have compatibility with the Model 80 is going to have to either buy the genuine article or lug in a special card to imitate it. Either way, such

people will be using software that doesn't exist today — software which directly addresses the new PS/2 serial chip!

The VGA colour output appeared to be perfectly standard, driving a perfectly standard screen. The power for the screen can be taken from a socket on the back of the machine. Makers of some screens recommend that you don't do this in case the power surge to both devices blows a fuse, but there appeared to be no such problem with the Qi range.

## Architecture

The machines tested, the 310 and the 650, both have Intel 80386 processors, but the 310 has the 16-bit bus version with the 24-bit address bus, the 80386SX. Both are 'true' '386 architecture chips. They will run 'protected' software, they can have memory in chunks bigger than 64k, and they can imitate a number of simultaneous 8086 PCs.

The 310, therefore, had the 16-bit version of the Micro Channel bus built in. On the motherboard was 1Mbyte of RAM, upgradeable to 16Mbytes (theoretically) with the right chips. The

**NEW**

## SCANNER BREAKTHROUGH! \$599

FIRST SCANNER WITH O.C.R. FORMAT & SOFTWARE TOGETHER FOR LESS THAN \$1000

**HS-3000**

**O.C.R. FORMAT**

**32 HALFTONES**

That's twice that of the others!

**400 DOTS PER INCH**

That's twice that of our nearest rival!

**\* SPECIAL MOUSE OFFER \***

**PRICE DIRECT FROM IMPORTER**

- \$599 for HS-3000 with free software.
- \$99 for DMS-100 MOUSE with free software.
- OR • \$649 for MOUSE package and SCANNER package



**D.F.I.'s ANSWER TO SkySCAN CHALLENGE! WITH AN AMAZING 400 D.P.I. RESOLUTION. TWICE THAT OF SkySCAN. WITH 32 HALF TONES, 16 MORE THAN SkySCAN WITH NEW SOFTWARE**

## SPECIFICATIONS IN BRIEF:

**SCAN WIDTH:** 4.1/8 (105mm)  
**RESOLUTION:** 100, 200, 300, 400, DPI SELECTABLE BY SWITCH ON SCANNER  
**GRAY SCALES:** Black & White and 32 Quasi-Tones  
**SCAN LENGTH:** 10 inch (255mm) Full Page  
**WITH HALO DESKTOP PUBLISHING EDITOR FREE!**  
 Which operates with all IBM and compatibles and prints in high resolution mono and colour. View the entire page at once. Then zoom in to edit sections with screen acting as window in virtual page. Designed to work with the scanner this program is one of the most sophisticated editing tools available with many facets too numerous to mention. With conversion utilities to convert files to Ventura, PageMaker, Windows... the features go on and on. Compatible to GEM, PC PaintBrush, WordStar 2000, WordPerfect...many more. You can store files with CUT, IMG, MSP, PCX, Tiff and more extension formats.

|                    |               |                                                                  |              |
|--------------------|---------------|------------------------------------------------------------------|--------------|
| HS3000 R.R.P.      | \$799         | <b>Optical Character Recognition Software Sold with Scanner.</b> | <b>\$349</b> |
| DMS Mouse R.R.P.   | \$169         |                                                                  |              |
| Halo D.P.E. R.R.P. | \$495         |                                                                  |              |
| Halo P.G. R.R.P.   | \$295         |                                                                  |              |
| <b>VALUE</b>       | <b>\$1758</b> |                                                                  |              |
| <b>PAY</b>         | <b>\$649</b>  |                                                                  |              |

**D.F.I. AUSTRALIA**

7 Days 9 a.m. — 9 p.m.  
 Phone: (02) 356 3221  
 Phone: (02) 344 7840

Fax/Tel: (02) 349 2247 (auto switching)  
 Fax/Tel: (02) 357 3917 (auto switching)  
 Mastercard/Bankcard Welcome



# Australia's leading PC discounters

## Product & Pricing — (02) 560 0811

### Fax: (02) 568 2196

#### SOFTWARE

##### UTILITIES

|                           |        |
|---------------------------|--------|
| Copy II PC .....          | 55.00  |
| Copywrite .....           | 98.00  |
| Disk Technican plus ..... | 245.00 |
| DS Backup plus .....      | 172.00 |
| Eureka - the solver ..... | 199.00 |
| Fastback .....            | 285.00 |
| Back II .....             | 188.00 |
| Desqview 2.0 .....        | 234.00 |
| Security Guardian .....   | 319.00 |
| Q DOS .....               | 95.00  |
| Sidekick plus .....       | 299.00 |
| Smartkey .....            | 68.00  |
| Superkey .....            | 139.00 |
| Xtree pro .....           | 195.00 |
| Hot .....                 | 250.00 |
| Mace .....                | 169.00 |
| Metro from Lotus .....    | 149.00 |
| Norton Commander .....    | 133.00 |
| PC Alien .....            | 86.00  |
| Brooklyn Bridge .....     | 230.00 |
| Desk-link .....           | 315.00 |
| Fastwire II .....         | 195.00 |
| Lap-Link .....            | 220.00 |
| Lap-Link Plus .....       | 249.00 |

##### DATABASE

|                   |         |
|-------------------|---------|
| DBase III + ..... | 900.00  |
| DBase IV .....    | call    |
| DBXL .....        | 330.00  |
| CLipper .....     | 888.00  |
| Quicksilver ..... | 936.00  |
| RBase .....       | 749.00  |
| Reflex .....      | 199.00  |
| Genifer .....     | 469.00  |
| Paradox V.2 ..... | 959.00  |
| Paradox 386 ..... | 1165.00 |

##### GRAPHICS

|                             |        |
|-----------------------------|--------|
| Fastgraph .....             | 290.00 |
| Formtool Forms Design ..... | 255.00 |
| Freelance .....             | 751.00 |
| Graph-in-the-Box .....      | 265.00 |
| Gem Graph .....             | 419.00 |
| Gem Draw .....              | 480.00 |
| Designcad 2D .....          | 550.00 |
| Designcad 3D .....          | 550.00 |
| Graphwriter II .....        | 756.00 |
| Harvard Graphics .....      | 529.00 |
| Magician .....              | 375.00 |

#### SOFTWARE

##### TRAINING

|                                |        |
|--------------------------------|--------|
| PC Tutorial .....              | 135.00 |
| Complete PC Introduction ..... | 94.00  |
| Learning DOS .....             | 90.00  |

##### INTEGRATED

|                    |        |
|--------------------|--------|
| First Choice ..... | 262.00 |
| Symphony .....     | 950.00 |

##### PUBLISHING

|                              |         |
|------------------------------|---------|
| First Publisher .....        | 149.00  |
| Gem Desktop Publishing ..... | 652.00  |
| Byline .....                 | 415.00  |
| Newmaster .....              | 149.00  |
| Pagemaker .....              | 1650.00 |
| Ventura .....                | 1800.00 |

##### PROJECT MANAGEMENT

|                               |        |
|-------------------------------|--------|
| Super Project plus .....      | 750.00 |
| Harvard Project Manager ..... | 759.00 |
| Timeline .....                | 732.00 |

##### WORD PROCESSOR

|                              |        |
|------------------------------|--------|
| Q & A .....                  | 564.00 |
| Wordstar 4 .....             | 519.00 |
| Sprint .....                 | 350.00 |
| Manuscript .....             | 733.00 |
| Multimate Advantage II ..... | 695.00 |
| Wordperfect .....            | 729.00 |

##### SPREADSHEET

|                 |        |
|-----------------|--------|
| Lotus 123 ..... | 649.00 |
| Quattro .....   | 336.00 |

**SECURITY** *Guardian* is a complete security, menu and logging system for PC's and LAN's. Only \$319.

#### SOFTWARE

##### ACCOUNTING

|                           |        |
|---------------------------|--------|
| Attache 4 .....           | 840.00 |
| In-House-Accountant ..... | 159.00 |
| DAC EASY .....            | 189.00 |
| SBA .....                 | 750.00 |

##### COMMUNICATIONS

|                        |        |
|------------------------|--------|
| Carbon Copy Plus ..... | 310.00 |
| Crosstalk XVI .....    | 223.00 |
| Softterm .....         | 472.00 |
| Supercomm III .....    | 165.00 |
| Mirror .....           | 139.00 |

##### OPERATING SYSTEMS

|                         |         |
|-------------------------|---------|
| Concurrent DOS .....    | 386.00  |
| 3 USER .....            | 634.00  |
| Concurrent PC DOS ..... | 538.00  |
| PC MOS/386 .....        | 1439.00 |

##### GENERAL

|                    |        |
|--------------------|--------|
| Print Shop .....   | 103.00 |
| Print Master ..... | 97.00  |
| Print Works .....  | 145.00 |
| Sideways .....     | 109.00 |
| PC GLOBE .....     | 150.00 |
| Hal by Lotus ..... | 230.00 |
| Metastock .....    | 495.00 |

##### PROGRAMMERS WORKSHOP

|                                        |        |
|----------------------------------------|--------|
| Nortons Guide to Pascal .....          | 145.00 |
| Nortons Guide to Basic/C .....         | 145.00 |
| Turbo Professional .....               | 279.00 |
| Turbo Analyst .....                    | 215.00 |
| Nortons Editor .....                   | 208.00 |
| C Tools .....                          | 342.00 |
| Turbo Power Tools Plus .....           | 281.00 |
| Lightwindow C .....                    | 237.00 |
| BTRIEVE .....                          | 715.00 |
| Taskview .....                         | 195.00 |
| T Bug Plus (Pascal 220 Debugger) ..... | 195.00 |
| Nortons Utilities .....                | 139.00 |
| Nortons Utilities Advanced .....       | 218.00 |

#### SOFTWARE



|                                 |         |
|---------------------------------|---------|
| Turbo Asynch Plus .....         | 280.00  |
| Turbo Basic .....               | 139.00  |
| Turbo C .....                   | 139.00  |
| Turbo Database Toolbox .....    | 133.00  |
| Turbo Editor Toolbox .....      | 133.00  |
| Turbo Gameworks .....           | 104.00  |
| Turbo Lightning (Vol. 1) .....  | 139.00  |
| Turbo Lightning (Vol. 2) .....  | 124.00  |
| Turbo Numerical .....           |         |
| Methods T'box .....             | 139.00  |
| Turbo Pascal Ver. 4 .....       | 133.00  |
| Turbo Pascal Grapix T'box ..... | 133.00  |
| Turbo Prolog .....              | 139.00  |
| Turbo Prolog Toolbox .....      | 139.00  |
| Paradox 2.0 .....               | 999.00  |
| Paradox 2.0 Netw. .....         | 1330.00 |
| Paradox 2.0 (366) .....         | 1199.00 |
| Sprint Wordprocessor .....      | 339.00  |

#### MICROSOFT.

|                                     |         |
|-------------------------------------|---------|
| Microsoft Flight Simulator .....    | 75.00   |
| Microsoft Basic Compiler .....      | 599.00  |
| Microsoft C Compiler .....          | 670.00  |
| Microsoft Cobol Compiler .....      | 1035.00 |
| Microsoft Cobol Toolkit .....       | 650.00  |
| Microsoft Excel .....               | 756.00  |
| Microsoft Fortran Compiler .....    | 670.00  |
| Microsoft Macro Assembler .....     | 225.00  |
| Microsoft Pascal Compiler .....     | 455.00  |
| Microsoft Project Version 2.0 ..... | 599.00  |
| Microsoft Quikbasic .....           | 120.00  |
| Microsoft Works .....               | 299.00  |
| Microsoft Word V4.0 .....           | 685.00  |
| Microsoft Multiplan .....           | 299.00  |

##### GAMES

|                                 |        |
|---------------------------------|--------|
| Lounge Suit Larry .....         | 55.00  |
| Driller .....                   | 63.00  |
| Kings Quest III .....           | 53.00  |
| Police Quest .....              | 55.00  |
| Platoon .....                   | 63.00  |
| Helicopter .....                | 55.00  |
| Space Quest II .....            | 53.00  |
| Thexter .....                   | 55.00  |
| Ancient Art of War .....        | 83.00  |
| Ancient Art of War At Sea ..... | 83.00  |
| Flight Simulator .....          | 85.00  |
| Jet .....                       | 102.00 |

Ph: (02) 569 0232

#### NEW PRODUCTS:

LOTUS AGENDA - BORLAND SPRINT - dBASE IV (soon)

TURBO PASCAL V5.0 (soon) - TURBO ASSEMBLER (soon) - TURBO DEBUGGER (soon)

#### TOTAL SOLUTIONS

3 COM NETWORKING PLANNED, SUPPLIED, INSTALLED  
PROBLEMS SOLVED BY EXPERTS

# MicroMania

**HARDWARE, SOFTWARE & PERIPHERALS AT *DISCOUNT* PRICES**

## PERIPHERALS

|                                     |         |
|-------------------------------------|---------|
| 2 Meg Mem Above Board - AT .....    | 365.00  |
| Logitech Mouse .....                | 199.00  |
| Logitech Hirez Mouse .....          | 289.00  |
| Microsoft Mouse .....               | 239.00  |
| PC Memory - 640K (OK) .....         | 130.00  |
| PC Mono/Graphics Card .....         | 185.00  |
| PC Multifunction Card               |         |
| - 384K (OK) .....                   | 195.00  |
| Power Supply - 135W .....           | 199.00  |
| Power Supply - 200W .....           | 315.00  |
| 8087-1 Maths Coprocessor .....      | 406.00  |
| 8087-6 AT Maths Coprocessor .....   | 320.00  |
| 80287-8 AT Maths Coprocessor .....  | 470.00  |
| 80287-10 AT Maths Coprocessor ..... | 550.00  |
| 80387-16 AT Maths Coprocessor ..... | 915.00  |
| 80387-20 AT Maths Coprocessor ..... | 1410.00 |
| Hyperam AT MF 512 Board .....       | 830.00  |
| Hyperace 286 plus .....             | 730.00  |
| H/D Controller XT .....             | 119.00  |
| H/D Controller AT .....             | 230.00  |
| RLL H/D Controller XT .....         | 137.00  |
| EGA Card (Yuko) .....               | 290.00  |
| EGA 1024 x 480 Card (Yuko) .....    | 355.00  |

## DRIVES

|                                      |         |
|--------------------------------------|---------|
| Floppy Disk Drive TEAC 360 .....     | 189.00  |
| Floppy Disk Drive TEAC-1.2 Meg ..... | 199.00  |
| Hardcard - Plus Devel 40 Meg .....   | 2137.00 |
| Hardcard - Plus Devel 20 Meg .....   | 1457.00 |
| Archive 40Mb Tape XLE .....          | 749.00  |
| Archive 60Mb Tape B/up Int .....     | 1152.00 |
| Archive 60Mb Tape B/up Ext .....     | 1425.00 |
| Miniscribe 20 Meg Kit .....          | 570.00  |
| Miniscribe 40 Meg Kit .....          | 705.00  |
| Miniscribe 44 Meg Voice Coil .....   | 1080.00 |
| Miniscribe 71 Meg .....              | 1690.00 |
| Seagate 50Mb (40Ms)-ST251-1 .....    |         |
| Seagate 80Mb T/H (4096) .....        |         |
| Toshiba 3 1/2 Drive .....            | 289.00  |
| Citizen 3 1/2 Drive .....            | 230.00  |

## MODEMS

|                                    |                     |
|------------------------------------|---------------------|
| Modem Cable .....                  | 22.00               |
| Netcomm 1200/In Modem .....        | 430.00              |
| Netcomm 123/In Modem .....         | 530.00              |
| Netcomm 1234/In Modem .....        | 660.00              |
| Netcomm 2400/In Modem .....        | 560.00              |
| Netcomm Autodem 12/12 .....        | 450.00              |
| Netcomm Autodem 123 .....          | 540.00              |
| Netcomm Autodem 1234 .....         | 660.00              |
| Netcomm Autodem 21/23 .....        | 380.00              |
| Netcomm Autodem 24/24 .....        | 580.00              |
| Netcomm External 3+12 Manual ..... | 273.00              |
| Netcomm Smartmodem 1200SA .....    | 622.00              |
| Netcomm Smartmodem 1234SA .....    | 900.00              |
| Netcomm Smartmodem 123SA .....     | 685.00              |
| Netcomm Smartmodem 21/23SA .....   | 510.00              |
| Netcomm Smartmodem 2400SA .....    | 842.00              |
| Netcom PocketModem .....           | - call for pricing. |



## SYNCOMP

— NEW RELEASES —

|                                                                       |  |
|-----------------------------------------------------------------------|--|
| Micro Xi, 10 MHZ, 3 1/2 Floppy, HD, 5 Exp. Slots .....                |  |
| Micro Ai, 12 MHZ, 1MB, 3 1/2 Floppy, HD, 5 Exp. Slots .....           |  |
| Mini Ai, 12 MHZ, 1MB, 5 1/4 Floppy, HD, 8 Exp. Slots .....            |  |
| Turbo Ai, 16 MHZ, 1MB, 5 1/4 Floppy, HD, 8 Exp. Slots .....           |  |
| Portable Ai, 16 MHZ, 1MB, 3 1/2 Floppy, 40 MB V/C HD, Gas Plasma .... |  |
| Portable 386i, 20 MHZ, 1MB, 3 1/2 Floppy, 40 MB V/C HD, Gas Plasma .  |  |
| 386, 20 MHZ in Mini, Desktop or Tower Case .....                      |  |

— 2 (two) year Limited Honeywell-Bull on site warranty —

## XT and AT SPECIALS

|                                              |         |
|----------------------------------------------|---------|
| XT Turbo, D/F 640k, Mono .....               | 1550.00 |
| XT Turbo, 20 Meg, 640k, Mono .....           | 1960.00 |
| XT Turbo, 20 Meg, 640k, EGA .....            | 2790.00 |
| AT 10MHz, 20 Meg, 640k, Mono .....           | 2829.00 |
| AT 10MHz, 40 Meg, 640k, Mono .....           | 3090.00 |
| AT 10MHz, 40 Meg, 640k, EGA .....            | 3765.00 |
| AT 16MHz, NEAT Chip set M/B, 640k to 8 Meg   |         |
| on M/B, 0 or 1 WS, LIM 4.0 compatible, 40    |         |
| Meg V/C 1:1 Interleave, Mono config. from .. | 3895.00 |
| Honeywell on-site optional                   |         |
| DOS 3.3 optional .....                       | 200.00  |

## MONITORS

|                                     |         |
|-------------------------------------|---------|
| NEC Multisync II .....              | 1260.00 |
| Thomson 450 Green (Dual Scan) ..... | 255.00  |
| Thomson EGA 4460 .....              | 829.00  |
| Teco 14" TTL Green .....            | 215.00  |
| Teco 14" EGA (Dual Scan) .....      | 745.00  |
| Teco 14" Multiscan .....            | 950.00  |
| Samsung CGA (1411) spec. ....       | 469.00  |
| TVM - MD II Multiscan .....         | 990.00  |
| Intra 14" Green .....               | 245.00  |
| Intra 14" Amber .....               | 245.00  |
| Intra 14" White .....               | 245.00  |

## COMPUTERS

|                                         |      |
|-----------------------------------------|------|
| EPSON Range .....                       | Call |
| ASI:                                    |      |
| - XT's in Mini or Desktop style         |      |
| - AT's in Mini, Desktop or Tower case,  |      |
| 12 or 16MHz                             |      |
| - 386's in Mini, Desktop or Tower case, |      |
| 20 or 25MHz, Cache Memory               |      |
| For configurations and prices .....     | Call |
| ALR Advanced Logic Research             |      |
| High End PC's, AT's and                 |      |
| 386's available .....                   | Call |

**Printer and Serial Switchboxes  
and Multiport Buffers  
CALL FOR BEST PRICES**

**Seagate**  
**HARD DISK SYSTEMS**  
**20 MB 30 MB**  
~~\$539~~ ~~\$579~~  
**\$519 \$549**

**ARCHIVE**  
40 Meg tape B/up XT/AT  
Archive Half-Height  
**\$749.00**

## PRINTERS

## FUJITSU

|                       |         |
|-----------------------|---------|
| Fujitsu DX 2400 ..... | 1065.00 |
| Fujitsu DL 2400 ..... | 1843.00 |
| Fujitsu DL 3300 ..... | 1145.00 |
| Fujitsu DL 3400 ..... | 1354.00 |
| Fujitsu DL 5600 ..... | 3300.00 |

## OKI MICROLINE

|                      |      |
|----------------------|------|
| ML 182/183 .....     | call |
| ML 192/193 .....     | call |
| ML 292/293/294 ..... | call |
| ML 390/391/393 ..... | call |

Others:

|                     |         |
|---------------------|---------|
| Brother M1709 ..... | 994.00  |
| Brother M1724 ..... | 1356.00 |
| Epson EX800 .....   | 1070.00 |
| Epson EX1000 .....  | 1300.00 |
| Epson FX850 .....   | 920.00  |
| Epson FX1050 .....  | 1150.00 |
| Epson LQ850 .....   | 1260.00 |
| Epson LQ1050 .....  | 1600.00 |
| Epson LQ500 .....   | 750.00  |
| NEC P6 .....        | 899.00  |
| NEC P7 .....        | 1137.00 |
| NEC P5 .....        | 1699.00 |



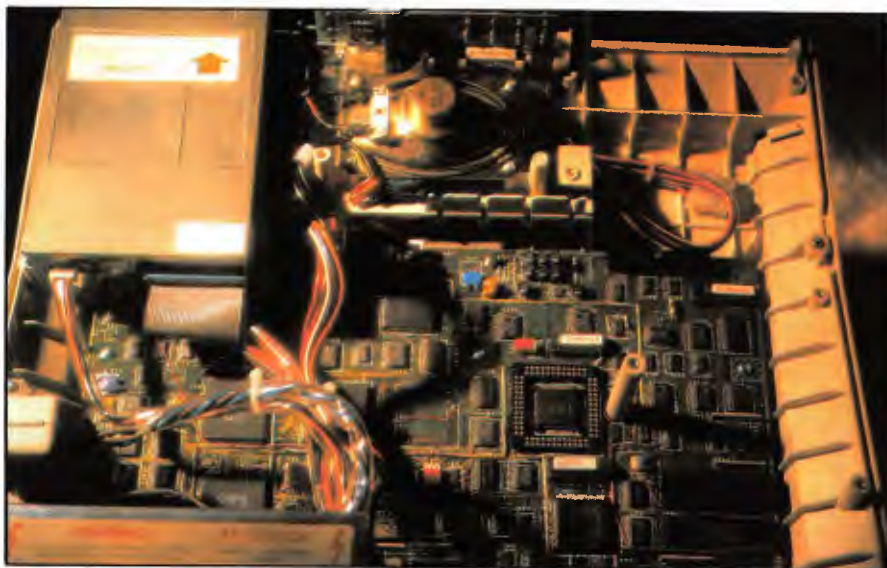
|                                     |         |
|-------------------------------------|---------|
| Star NB2410 - 24-Pin 10 inch .....  | 1044.00 |
| Star NB15 24-Pin .....              | 1684.00 |
| Star NB2415 Printer .....           | 1400.00 |
| Star ND10 - 24-Pin 11 inch .....    | 836.00  |
| Star ND 15 Dot Matrix Printer ..... | 936.00  |
| Star NR15 .....                     | 1166.00 |
| Star NX15 .....                     | 699.00  |
| Star NX1000 .....                   | 499.00  |
| Star NX1000 Colour .....            | 599.00  |
| Star NX24-10 .....                  | 798.00  |



All prices include sales tax. We accept Bankcard, Mastercard, Visa.  
Freight extra. Prices may change due to factors beyond our control

180 Parramatta Rd, Stanmore N.S.W. 2048 Ph: (02) 569 0232 Fax: (02) 568 2196





*The most striking internal feature of the 310 is the small size of the main board and the MCA slots. The extra processor controls the infra-red lock*

650 was fitted with the full 25MHz 80386, and a 32-bit bus. During most of the test, however, the 25MHz model was being upgraded. As a result, it's hard to say exactly what was tested — the processor, the bus, the BIOS or the clock speed.

Apricot rates the motherboard at 33MHz, and says to expect 33MHz 80386 chips within six months. However, there's a vast difference between a motherboard which will run at 33MHz and chips which are finally available to run at the same speed.

When a semiconductor company builds chips, the first samples are less than guaranteed, shall we say, to be flawless. Several of the possible flaws can prevent anything working at all. However, assuming that the chip is correctly designed, it will run — but at a slower speed than when the process of producing the chip is refined, understood and perfected. Chip makers have described their work as an 'art form' rather than a science, and tales are told of production lines which one day made excellent silicon chips, and the next refused to produce a working circuit, and no-one ever found out exactly what magic ingredient went wrong.

Tall tales from Silicon Valley aside, the chips which matter on the Apricot board are the Chips & Technologies bus driver chips. They are the hottest new technology around. C&T has delivered working Micro Channel drivers. In doing so, it has wiped the floor with Western Digital and Intel, both of whom have announced that they have cracked IBM's secrets, the MCA circuit, but failed to get the silicon up to speed.

That is a triumph for C&T, spoiled somewhat by the fact that the first chips turned out to have a slight problem with the bus clock signals. In September, the MCA chips couldn't generate the right clock pattern to drive other circuits on the MCA bus faster than 20MHz. The next generation of chips (they said with fingers crossed) would have this problem sorted out, and would run at the full 25MHz as a temporary fix.

Unfortunately, this fix arrived at the Research and Development building the same day as I. At the risk of being considered 'anecdotal' by my serious-minded colleagues, I have to report that Apricot staff and I were equally embarrassed by this.

I was shown into a room with the SX-

based 310, where I solemnly ran tests on a machine which had already been covered by a rival paper, and pretended I wasn't grinding my teeth; while they solemnly provided me with whatever equipment I needed, and pretended they weren't running around like headless chickens trying to get the 650 to work.

So what did I actually test? More to the point: what did my colleagues on that rival paper *imagine* they tested?

## Missing bits

For a start, I couldn't test the VGA. It was not only incomplete on the pre-production prototype, but it obviously had bits of firmware still to be finished. An example: when a program ran in 43-line mode, it left the screen full of garbage when switched back to 25-line mode. In 43-line mode, again, it filled the full width of the display — but left enough for another (guessing!) 12 lines at the bottom.

Next: I couldn't test the floppy disks. Admittedly, one of the hardest tests for a ROM BIOS is to take a high-density 5.25in drive and make it read a 360k standard diskette. Another tricky setup is to write to a 720k standard 3.5in diskette in a high-density 1.44Mbyte drive. Copying from one to the other is asking for problems, because the BIOS tends to check the format of each disk on each sector it reads and each sector written.

That said, nearly eight minutes to copy less than 360k of data does indicate that someone has a list of tasks to be taken in order of priority; and while they may be nearing the end of the list, there are a few boxes still to fill in. Apricot is not going to release disks with a data transfer rate of 750 bytes per second!

## In perspective

Now that Apricot has taken the plunge, its rivals will have to get off the fence. A lot of them have announced support for the EISA (Compaq) extended AT bus. Realistically, this is just so they don't have to pay royalties in the unlikely event it succeeds in a couple of years time.

Apricot doesn't have IBM's problem of trying to kill off the old bus. It will carry on making its Xen machines until people stop buying them — which won't be this year, nor next. But the path of the next few months will be stony.

My own considered opinion is that you should rate the Qi range as a 'must' for the shortlist, whatever horror stories appear in the less-informed daily papers. Perhaps it would be prudent to wait for another couple of months before trying to spend the money, while Apricot does eliminate the inevitable early hiccups; but, when they *are* sorted, it will be money worth spending. And the prudent buyer will not take the box home without testing the specific software that is to be run, and the specific peripherals that must be fitted. In particular, the entry-level 310 is bound to be a success because it actually undercuts several AT standard machines while offering a vastly superior specification.

What the Qi 310 will do for the industry is to prove, once and for all, that multi-tasking is not just an academic notion which real users don't want.

# There's a whole lot of communication power locked in your computer.

All this time, the world's most powerful business communication tool has been sitting unrecognised on your desktop. Your personal computer.

True, its awesome communications potential has been locked away inside, beyond your reach. But now the key to setting it free is here. Desklink.

This is a remarkably simple new software package for all IBM and IBM-compatible computers, and it enables you to communicate instantly with the rest of the world — to send letters, memos, messages, spreadsheets, telexes, faxes, even whole computer files, across the corridor or across the globe.

At the touch of a button. Without moving away from your desk.

Just imagine the implications of that. No more frustrating fax queues. No more tedious typing. No more courier charges. And equally important: there are no complex commands to learn. With Desklink, you simply compose your message, select the recipient from a



computerised "business card" list and put the message in an on-screen out-tray.

Then, Desklink flashes it to its destination. While you put the time saved to more profitable use. Incredible? Yes:

## Now you can set it free.



every bit as incredible as the telephone, telex and fax were in their day. And probably more world-changing.

Desklink brings together the resources of Australia's top communications suppliers. Designed and developed by CyberSoft, it's the factor that makes Telecom's KEYLINK messaging system easier and much more accessible.

And to mark Desklink's launch, NetComm the nation's number one modem manufacturer is bundling it with selected modems: or as an upgrade for existing NetComm Program V2 and V3 users: or on its own.

Call the KEYLINK hotline today on (02) 261 7977 or (008) 023 223. It's startling but true: the next major advance in business communications is locked in your computer now.

And it only needs Desklink to set it free.

**DESKLINK**  
Your instant link with KEYLINK\*

\*KEYLINK — A SERVICE OF TELECOM AUSTRALIA.



## The MCA bus

The Micro Channel's features are many, but it isn't necessary to list them all. The ones that matter technically are: true 32-bit addressing; multi-master capability; burst mode DMA; and size.

### True 32-bit addressing

The original PC was described, when it first appeared, as a 16-bit machine. But as everyone now knows, its fundamental limitation was not the 64k data and program segments, but its 1Mbyte of total memory. When the AT came, it pushed this up to 16Mbytes. Today, only an optimist pretends that 16Mbytes of memory is enough for serious work over the next decade. Already, machines with 16Mbytes on the motherboard alone are regarded as 'limited' because software like OS/2 and Xenix makes a 5Mbyte machine an absolute minimum.

In other words, anybody looking to the future must regard the AT and its '286 as obsolete. To be sure, it will still sell; but since CP/M still sells on the Amstrad PCW, that is a red herring.

The 80386 chip can handle 4000Mbytes. Most people are happy with that limitation, but not many systems can match it. A system with the 32-bit version of the Micro Channel can

provide access to the full '386 memory capacity. And a '386 system with the 16-bit Micro Channel can still access 24 'bits' worth of address.

### Multi-master

The standard '386 is powerful, but a user who spends money on that chip wants performance from it.

Plug a new peripheral into your system, and on the AT it's quite often a handicap. It provides more data for the main processor to shuffle about; it requires complex functions to be carried out; and it puts new memory maps into the system.

Today's peripherals have their own processors, and they want access to the system resources — the disk, the ports, the screen and memory. And they want to do this fast, without handing data, one byte at a time, to the main processor. This means they share the system bus. The Micro Channel permits this. Most engineers agree that while it permits multi-master control, it isn't very clever about it, and it would be relatively easy to come up with a better technique. But none

*continued . . .*

As indicated, I couldn't test the security system. We did run through it so that I would have an idea how it worked, but it *didn't* work. At a guess, it will never be simple, but I do expect it to work when Apricot launches it.

The network may well work, but you need more than one machine to test a network, and the number of prototypes that can be taken out of an R&D lab for the entertainment of a journalist is limited at the best of times. The phrase

'the best of times' just doesn't apply when there are something like four weeks to go before launch and five or six known fixes to install and test . . . no, they were sorry, but they couldn't. I can't pretend I was entirely sorry. Testing a network is not a hobby I'm eager to add to my list of after-midnight interests.

They wouldn't let me open the box of the '386 25MHz machine. Why, is anyone's guess — I knew it was a prototype, they knew I knew it. What

could they possibly be hiding? A mole tells me it was 'a very funny mistake which has embarrassed them all'. So what? The prototype without mistakes has yet to be built. Rumour says it was a '386 chip upside down . . . I don't know if I believe that or not, but it must be something along those lines. Again, it will be fixed by the time the machine appears in shops.

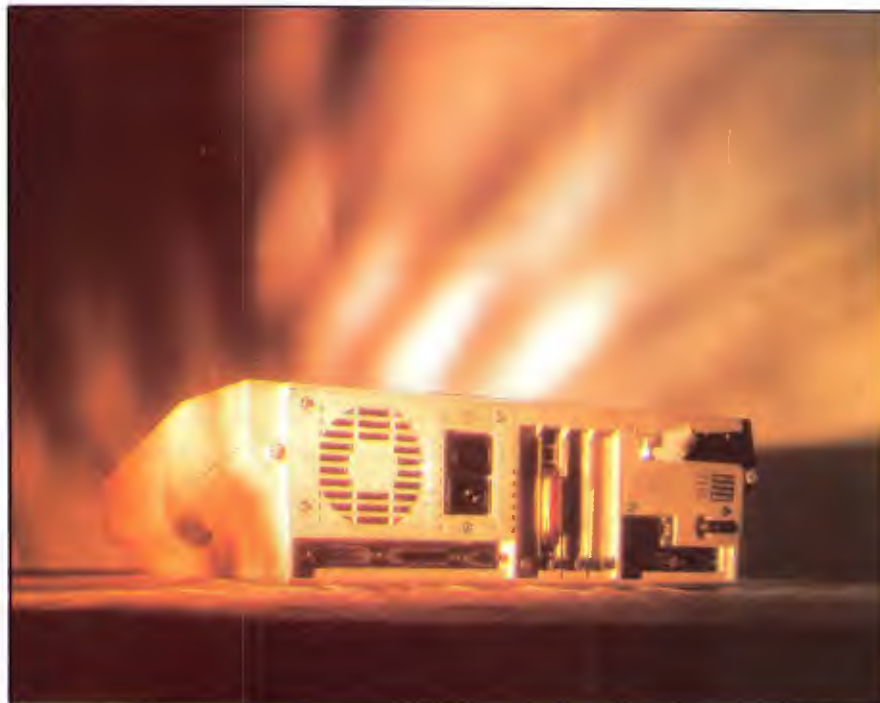
When that happens, anyone who does get hold of a key to the box will quickly see that the board doesn't look like the photographs Apricot issued at the launch. Chips will have been moved. About the only thing you can be sure of is that the Micro Channel slots will be roughly as shown. They have to be, if those tall cards are to fit in under the 'bump' of the display stand.

## Software

What about software? At least I was able to test the DOS, version 4.0. Again, the need to have this review done by the time the machine began appearing for sale, meant that the version of DOS was not bug-free. When I try to use the 'diskcopy' command and it logs onto the floppy disk I'm trying to format — and no, COMSPEC showed C:\COMMAND.COM as you would normally expect — then I have to confess myself beaten.

Our benchmarks showed that both the SX and '386 versions are already faster than their rivals. A lot of this will likely prove to be the 16-bit data path to the screen chips.

But, when analysed, the performance figures for the disk on the '386 are puzzling. In particular, where all other parameters showed the 25MHz '386 to



*The back view reveals a case lock and four MCA slots. There are two serial ports, one of which is synchronous, and a parallel port*

# STOP PC THEFT ... without ruining your desk



It's a world first! Total PC and data security, without having to tie your PC down. Now nobody can "walk away" with your PC. AlarmCard is a complete alarm system, including battery, siren and software. Even your PC's cover is secured with a special cover locking screw. The Alarmcard fits into any single (short) slot in any IBM PC/XT/AT/386 or IBM PS/2 models 25/30 and provides:

- **Alarm protection** against theft. Move the PC and the alarm goes off – just like your car alarm. For legitimate activities, such as relocating the PC, user controlled password-protected software deactivates the card.
- **Data protection.** User controlled password software prompts the authorised user every time the PC is switched on. Three wrong guesses, and the alarm goes off. This program allows for centralised control of computer hardware, restricted access to nominated PCs, and a high level of data security.
- **Centralised security.** It will soon be possible to tie AlarmCard fitted PCs to a building's main security system for instant response to PC theft or unauthorised access. Hardwire PCs direct to your building's security system,

## Here's How



CCTV, guard station, auto-diallers or auto-doorlocks.

AlarmCard's features include:

- Password Protection ■ On-screen diagnostics ■ 85db anti-theft alarm ■ No keys needed ■ User installable in minutes ■ One year warranty ■ Secure locking cover screw ■ Protects PC, PC use, and access to sensitive data

At only \$299, AlarmCard is the lowest cost and most effective investment you can make to protect your PC. Call now for immediate delivery. Bankcard, Visa, Mastercard accepted. Dealer enquiries invited.



Suite 303, Henry Lawson Business Centre  
Birkenhead Point, NSW.  
(PO Box 389 Drummoyne, NSW 2047)



## AlarmCard

*Don't leave your computer without it!*



of these 'better ideas' already has a mighty 21 per cent of the market.

## Burst-mode DMA

When a coprocessor wants to use the system bus, it isn't just interested in getting data from the disk and putting it into memory or onto the optical drive, without interference from the central chip. It wants to do it fast.

On the industry standard bus, direct memory access is possible, but only one clock cycle at a time. On the Micro Channel, a device can take over the bus for extended periods, and pump a stream of data one way or the other at very high speeds.

It is argued that the MCA design is flawed, because it only allows 16-bit DMA. When I find a peripheral which wants its data faster than this, I'll write about it.

## Size

The circuit boards of today are smaller than the PC, with 10 times as much silicon on them. The trick is carried out at two levels. First, the chips are much denser; and second, they are closer together.

Getting chips closer together has been achieved by using 'surface mount' technology — chips with tiny legs that don't

go through the board but rest on top of it. The result is that a 32-bit Micro Channel bus can be squeezed onto a smaller area of the board than the 16-bit AT bus.

## The marketing hype

Most people who have bought PS/2 machines have not taken out a stop-watch and timed the burst mode DMA. They haven't tried plugging transputer boards in to handle the graphics, and they aren't measuring the size of the components. They are following an instinct which says that IBM's new standard is the thing of the future. This is marketing hype.

IBM has taken a risk by not only launching a new standard, but by dropping the old one. Its rivals have pointed out that the market for the old one is much bigger than the new one, and have proclaimed, loudly, that IBM's decision is a big mistake. This, too, is marketing hype.

The factor to remember is this: IBM's innovation is not the dominant standard — the AT bus is. But as a minority, the PS/2 bus is impressively big — even rival Compaq's figures show it having 21 per cent of the PC/AT (16-bit bus) market. Apricot would be quite content with a five per cent share of the IBM market, and must realistically feel that it might get more. And at the moment, no-one else is competing.

be roughly twice as fast as the 16MHz SX (exactly as you'd predict) the random disk test ran slower on the more powerful model.

The disk was actually the same drive. The interleave is 1:1 on both machines. There are literally dozens of possible reasons for this, from the size of the cache, the effect of the cache, the software for the cache, the BIOS, the bus, the controller data path . . . Apricot engineers were as puzzled as I was, and I'm not about to claim that I'm an engineer. By this time, I'm sure they'll have found out the reason, but APC's printers can't take a holiday while we wait.

At the time of writing, MS-DOS 4.0 and Windows 2 plus several Windows-based applications products are what you get, and if you want to use the Qi security feature, that's all you can have.

One day, there will be a 'XENIX PACK', a security pack and a DTC pack, and so on. When they appear, we'll report details. At the moment they are just promises.

Windows/386 is a multi-tasking operating system. There are others on the market, but no schedule for adopting them. Each has its pros and cons, and each user has a unique set of reasons for liking one and disliking another, and this is not the place for a comparative review of them all. I'll admit to a personal, private reluctance to use Windows, and a preference for DESQview. But if I got Windows/386 free and had to pay for DESQview, I'd probably use Windows and like it.

## Security

In Britain, the home of Apricot, the com-

pany sells PCs very well (comparatively) through ordinary computer dealers whose customers are generally small businesses. It has traditionally had less share of the big, corporate market, with people like ICI, Shell and Ford buying dozens or even hundreds of the same brand of machine at a time. But in the area of finance and banking, Apricot has been selling specialised machinery successfully, and these users are (justifiably) paranoid about people getting information out of their computers. They are equally paranoid about people putting information in.

Apricot's solution is an infra-red key, a special security processor with its own real-time clock and a key to lock the box. The security system will work very rigorously. I suspect I can think of ways around the first couple of security levels, but once the Qi owner starts encrypting files with a password, these paranoid customers are going to be well satisfied.

The rest of us really aren't going to bother because using the security system is fussy enough, but installing it is a nightmare.

Apricot recommends that 'one person alone is in charge of security in each work group'. That person will collect all reference diskettes from all machines. The 'reference diskette' is fundamental to the PS/2 and Micro Channel. On it are all the details of the system you own — how much memory, what type of disks, peripheral cards and passwords.

Apricot does indeed use standard IBM PS/2 passwords. It also uses the MCA auto-configuration system which automatically looks at an electrical code on every MCA card plugged into the box. From this code, the system can tell what

sort of card it is. People who build cards get a code number from IBM, and the auto-config program looks them up.

But you can, if you want, install Apricot's own security system instead of the IBM system. This is based on the infra-red key code. Each time the button on the key is pressed, it generates a new code (eventually it will repeat, but Apricot isn't saying how many days (months?) this will take). The processor on the main board knows what the next code will be, and if it misses one or two or one or two dozen (I don't know what the limit is), it will skip them and recognise the next one. Without pressing that button, you can't start the system. And you have to know the password.

Even when a user leaves the desk for five minutes, the machine can be disabled. The diskette can be made write-only or read-only, each peripheral card can be disabled, each resource can be switched on or off, from keyboard to screen.

The worst that could happen, then, must be that some user drops their key under a steam-roller and forgets the password. To guard against this, there must be a master configuration disk. If that gets corrupted, you're in the sort of trouble that makes locking your keys in the car seem trivial. Apricot says it *can* help, but if you've also encrypted files, you are probably going to have to guess at what they might have been.

Each machine can have several users and recognise several keys. And one key can (obviously) work on several machines if the master disk records them.

Different users can be set up to use the machine at different times, so no sneak-

# To Einstein a Second Son

Just as Einstein's special theory of Relativity ushered in the atomic age. So with Advanced REVELATION, a new era in data management is born.

Congratulations are due all round for the most powerful and friendly database management system ever.

Advanced REVELATION's innovative technology rivals Einstein's radical theories. For example, the new "Law of Variable Length" smashes conventional fixed-length field and record systems.

Before this new law of data, you had to fit in with a system. Now with Advanced REVELATION your system fits you.

For such a relative youngster, Advanced REVELATION has a very sophisticated architecture, giving you;

- up to 65,000 characters per field
- word processor fields
- virtual space windows
- unlimited records and open files

Quite the little prodigy, isn't he?  
And there's more:

Mac-like environment on your IBM PC/XT, AT, PS/2 or compatible, with exploding windows, three-dimensional menus, popups, and many more!

But like all good ideas, Advanced REVELATION is simple. Anyone who can use a wordprocessor can build applications.

And for Advanced users?

It will bring out the Einstein in you.

Call us or your nearest dealer now to discover more.



Sole Australian Distributors

**COSMOS**™

Phone (02) 908 4033  
Level 1, 7 Young Street, Neutral Bay  
Sydney Australia

**PICKSOFT**  
THE PICK SOFTWARE HOUSE  
**INFINITELY HARDER WORKING**



# SAVE YOUR PC FROM EARLY RETIREMENT.



## GET HAUPPAUGE'S NEW 386 MOTHERBOARD.

### 386 SPEED — 16 AND 20 MHZ

Give your PC a new lease on life! With our industry first 386 MotherBoard, your PC, PC/XT or PC/AT will revel in speeds equal to the Compaq DeskPRO 386. And faster. Because we've built in 1 Megabyte of high speed RAM and a 387 math coprocessor socket for speeds that will knock you off your rocker.

To keep retirement at bay, our 386 MotherBoard is compatible with the PC/AT (BIOS and I/O) — allowing you to run the new generation of DOS, OS/2. We've also included 16-bit expansion slots that accommodate the latest I/O expansion cards. No accelerator card can give you so much versatility.

With 386 power and true AT software compatibility, your business, desktop publishing and engineering applications will get a boost to boast about!

**Technical Features** ■ 16/20 MHz 80386 ■ 1 Megabyte of 4-way interleaved RAM ■ PC/AT compatible I/O and BIOS for support of OS/2 ■ 8-bit expansion slots ■ 16-bit expansion slots ■ One 32-bit RAM expansion slot ■ Optional 16/20 MHz 80387 math coprocessor.

*"Judged on price, performance, and ease of installation, the Hauppauge 386 MotherBoard is easily the Upgrade Product of the Year."*

— Robert Luhn, PC World

For more information on our easy-to-install MotherBoard, call:

### WESTERN COMPUTER

299 Sandgate Rd., Albion  
Brisbane, Q 4010 Australia  
Ph: (07) 262 3122  
Fax: (07) 262 4957

**Hauppauge!**

# BENCHTEST

ing back while the night-shift is working to copy software or steal secrets for your moonlighting business. And if anyone does start typing in invalid passwords, they are all recorded. After three goes, the machine complains, loudly, and locks itself up for a while (you decide how long).

The password can expire on a certain date, or the user can expire — for example, after serving notice, or after a temporary spell of employment. And specific software can be excluded from specific users.

## Documentation

No doubt this will be good. I met the man who was writing it and he seemed to understand what was going to happen inside the system, and was able to teach me how to use the security system. Had the security system been debugged when we looked at it, we might have been able to test it . . .

Apricot will offer a year's free maintenance on these systems, which means that the company had better be right about how easy the support function will be, or the money they hope to make will be hard to come by.

## Prices

The lowest price Qi is the 310. It's based on the 80386SX running at 16MHz, has 1Mbyte of RAM and a single 1.44Mbyte floppy and sells for \$6006. At the other end of the 300 series is the 350ti which has as extra another megabyte of RAM, a 47Mbyte hard disk and a 40Mbyte tape backup drive; it retails for \$10,434. The 600 series starts off with the 650 equipped with a 20MHz 80386, 1Mbyte of RAM, a 47Mbyte hard disk and a price tag of \$10,437 and extends up to the 660ti with a 25MHz 80386, 1Mbyte of RAM, 118Mbyte hard disk, 40Mbyte tape backup drive and a price of \$17,080.

The biggest, even in the very pre-production form we saw it, was fast — very fast. Its price is, nonetheless, reasonable by workstation standards, and a lot of workstation users will be quite happy with one. It will certainly be a severe temptation for the most loyal IBM system buyer.

## Conclusion

Apricot is ironically reaping the reward of having seen its original model, the Apricot PC, collapse when the standard

turned out to be IBM's PC, because it now has almost no royalties to pay to IBM for the old machine. At the time Apricot nearly died, but it came back and has been making a modest living selling AT clones, the Xen and the Xen i.

Compared to Compaq, currently writhing in agony over IBM's demand for back royalties on all its PC sales, Apricot can follow the new Micro Channel marketplace and make a clone to exploit the new demand. It expects to take some sales from IBM, but it also expects to see other competitors' customers cross the floor.

The decision to choose the Chips & Technologies version of the MCA drivers was obviously right, because rival designs are still in the laboratory. The style is good, and the extras are exactly what a lot of wealthy customers wish they had in a standard IBM PS/2. These designs must put Apricot at the head of a lot of shopping lists, where previously the buyer wouldn't have admitted to having heard of the company.

END

*Apricot computers are distributed in Australia by Barson Computers, tel: (03) 419 3033.*

# BEAM COMPUTERS PTY LTD

## CHRISTMAS SPECIALS

### COMPUTERS

1. PC/XT 640K 10MHZ 1 FDD 101 KBD DOS 3.3 ..... \$1100.00
2. PC/XT 640K 10MHZ 1 FDD 101 KBD DOS 3.3 20 MB HDD. 12" TTL MONITOR ..... \$1710.00
3. PC/XT 640K 10MHZ 1 FDD 101 KBD DOS 3.3 20 MB HDD. CGA THOMSON MONITOR ..... \$1999.00
4. PC/XT 640K 10MHZ 1 FDD 101 KBD DOS 3.3 20 MB HDD. EGA THOMSON 4460D MON. .... \$2410.60
5. PC/AT 640K 10MHZ 1.2 FDD 101 KBD DOS 3.3 MULTI / CARD. SERIAL / PARALLEL ..... \$1999.00

### MONITORS

1. MONO MONITOR G/A ..... \$162.50
2. MONITOR COLOUR CGA ..... \$490.00
3. MONITOR EGA THOMSON 4460D ..... \$650.00

### PRINTERS

1. STAR NX 1000 B/W ..... \$430.00
2. STAR NX1000 CL. COLOUR ..... \$540.00

### ACCESSORIES

1. STAR NX1000 PRINTER RIBBONS ..... \$12.00
2. STAR NX1000 CL PRINTER RIBBONS ..... \$22.00
3. BMO CONTINUOUS PAPER #2000 SHTS ..... \$35.00
4. QUICKSHOT JOYSTICKS ..... \$25.00
5. GENIUS MOUSE GM6 + SOFTWARE ..... \$85.00

### SPECIALS OF THE MONTH

1. THOMSON EGA 4460D MONITOR INC. EGA GB2000 CARD. INC THOMSON MOUSE ..... \$799.00
2. SUPER 5 AT LAPTOP INC. 20MB & MODEM INC. CARRY CASE ..... \$4999.00

# DEALER ENQUIRIES WELCOME # ALL PRICES INCLUDE TAX # FREIGHT EXTRA # POST OR COURIER

## BEAM COMPUTERS

79 DARLING STREET EAST BALMAIN. 2041 PH: 02 810 1393 / 02 810 3984 FAX: 02 810 7798



# ISYS finds things faster than your mother.

She could find anything. Right?

You'd throw things at random into your drawers and forget about them.

She'd somehow know just where they were when you needed them.

Anyone who uses word processing a lot knows how essential it is to be able to find things fast.



Journalists writing their next Walkely Award winning series of articles, lawyers searching for legal precedents in past cases, teachers updating their lecture notes, salespeople, advertising agencies, banks, even software developers sorting out their source code.

You have something in the back of your mind: "I wonder if I have anything on file about IBM and legal issues."

Just ask ISYS to go fetch. Ask it to find you all references to IBM. Ask it to find all references to IBM with the words "legal," "law" or "court action" within the same paragraph, or within 10 words or in the same document.



Ask it as complex a conjunction as you like.

Presto. ISYS will be back with the listings and reference pages in a flash.

Because ISYS is unlike any other system you've seen. ISYS is super fast Full Text Retrieval and can index up to 2,000 million words.



ISYS remembers every word you've ever written and where you wrote it.



You can enter it in any order you like and you'll never lose a file or record again.

Each day at lunchtime or at night you run ISYS through the work you have done to keep it completely up to date.

Every day, every week or every month, in fact whenever you like, you can leave ISYS to update the work you've done. You don't even have to tell it what needs updating - it works that out for itself.

ISYS is so smart it will even paste across from one word processing system to another, Multimate to Wordstar, for instance.



ISYS is also TSR so at your command it will pop up in a window to go search for text for you while you are in the middle of another file.

ISYS makes your single word processor a powerhouse of usable knowledge, and just imagine what it can achieve within a network. You won't know how you ever got along without ISYS.



Created in Australia by Odyssey Development and backed by our full technical support.

Order now direct from Odyssey Development for \$486 (including sales tax) or ask us to send you a demonstration disk.

Phone (008) 252 510 or in Sydney

260 0220 (both 24 hours). Or clip the coupon and get ISYS working for you fast.

YES. Please send me ISYS, the revolutionary new Full Text Retrieval system that turns my word processor into a memory powerhouse. ISYS will be courier delivered to me for \$486 (including sales tax). Post to Odyssey Development, P.O. Box 57, Crows Nest, NSW 2065.



I enclose a cheque for \$ \_\_\_\_\_ for

☐ copies of ISYS. Or debit my ☐ Amex

☐ Visa ☐ B/card ☐ Diners Club ☐ M/Card.

Card No. \_\_\_\_\_ Expires \_\_\_\_\_

Or ☐ send me the ISYS intro disk.

Or ☐ call me with details of network prices.

Name \_\_\_\_\_

Address \_\_\_\_\_

Postcode \_\_\_\_\_

Company \_\_\_\_\_

Title \_\_\_\_\_ Tel. \_\_\_\_\_

Signature \_\_\_\_\_

**odISYS**  
ODYSSEY DEVELOPMENT

**The more you use  
a word processor,  
the more  
you need ISYS.**



Odyssey Development Pty. Ltd.,  
133 Alexander Street, Crows Nest, NSW 2065.

\*ISYS is compatible with WordStar, Microsoft Word, MultiMate, WordPerfect, Professional Write 2\* and can also read DCA and ASCII standard files to which many products are capable of converting.

APC 02

# Ham and Chips

***If you thought that the telephone modem provided the only link between computers, think again. As Rupert Goodwins and Peter Hallgarten describe, a little radio activity can provide packets of fun — when you make the right connections.***

Behind the back of Telecom, unnoticed by the computer community and largely untouched by official intervention, a global digital communications network has sprung up over the past few years. Constantly growing, it uses some of the latest commercial techniques as well as developing many of its own. And a year's subscription to use it as much as you like costs around \$28, with no call charges. It's as free, in fact, as the air which it uses.

It is packet radio. A combination of computers and amateur radio, it provides much the same facilities as a wired packet-switched system (PSS), except that the communications are carried by radio and the system is maintained by people who do it for fun and the technical challenge.

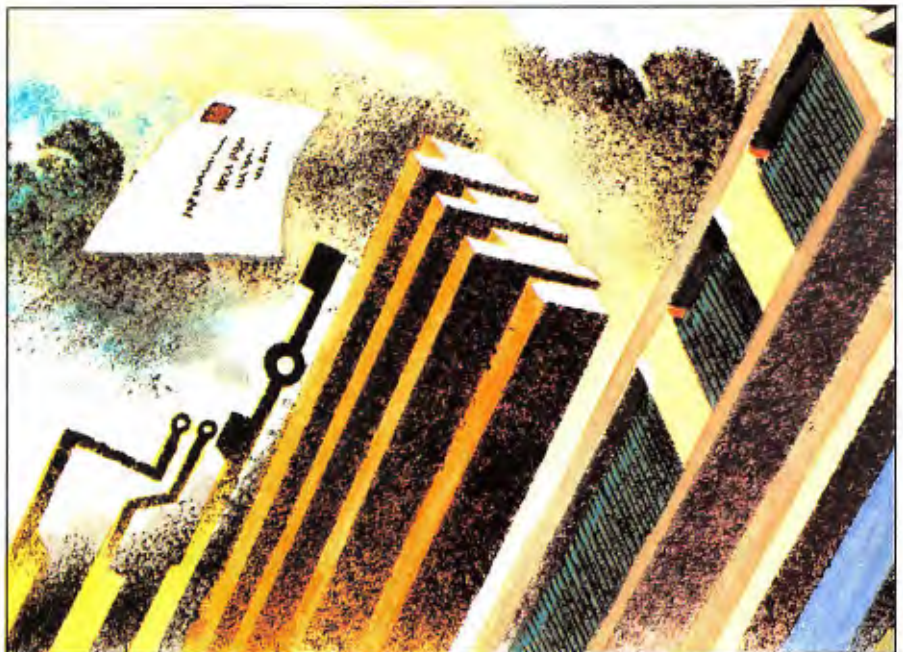
Radio amateurs have traditionally been at the forefront of electronic development. For a considerable period, the wireless was all there was to electronics.

The first computers grew to a greater extent out of circuits designed for use in radio and radar, mostly by people whose enthusiasm for the subject was often mirrored in their amateur activities.

As electronics diversified, amateur radio kept pace. There are a number of amateur radio satellites in orbit (there was even a radio ham on board one of the pre-Challenger shuttles), and such feats as transAtlantic colour TV are not uncommon.

## *Radio meets the micro*

The arrival of the home computer in the 1980s provided stiff competition for



traditional technical hobbies. It was irresistible for the electronics buff who, by and large, turned into a programmer. Hams, however, absorbed the new toys with ease, and a considerable number hooked up the cassette interfaces of their Tandys and Commodores to the microphone sockets of their transmitters. By SAVEing a program like this, any number of receivers within range could LOAD it while it was being transmitted.

This was cheaper than using a modem, but there were problems. Not everyone had the same computer, range was limited because the frequencies capable of covering long distances are

also the noisiest and least reliable, and computer cassette systems are very sensitive to even the smallest hiccup, let alone the crackles and bangs of low-power radio links.

## *The birth of packet*

Meanwhile, in the US and Canada, radio networking had been developed. Most of the work was done on 'packet' systems, where information is chopped up into bundles of 10 or 20 bytes, labelled with an address and other information and then fed into a common carrier. It's a close analogy to the postal system; the Post Office can accept an envelope from



# COMPUTER SHARK



|                                      | ex<br>tax | inc<br>tax |
|--------------------------------------|-----------|------------|
| <b>PRINTERS</b>                      |           |            |
| Toshiba P321SL, P341SL & P351SX..... | Call      | Call       |
| Fujitsu DX2300 80c 9 pin .....       | \$667     | \$784      |
| Fujitsu DX2400 132c 9 pin .....      | 859       | 1009       |
| Fujitsu DL3300 80c 24 pin.....       | 922       | 1084       |
| Fujitsu DL3400 132c 24 pin.....      | 1090      | 1279       |
| Star NX1000 .....                    | 410       | 482        |
| Star NX1000 Colour.....              | 484       | 569        |
| Panasonic 80c 9 pin.....             | 339       | 399        |

|                               |     |      |
|-------------------------------|-----|------|
| ADI High Res Green 14" .....  | 192 | 225  |
| ADI High Res EGA 14" .....    | 679 | 799  |
| TVM Multisync Mono.....       | 370 | 435  |
| NEC Multisync II.....         | 990 | 1150 |
| Everex High Res EGA 14" ..... | 599 | 705  |

## MONITORS/TERMINALS

|                         |     |     |
|-------------------------|-----|-----|
| Smartmodem 123SA.....   | 545 | 640 |
| Smartmodem 1234SA.....  | 685 | 804 |
| Smartmodem 21/23SA..... | 390 | 458 |
| Autodem 24/24 .....     | 454 | 534 |
| Autodem 123 .....       | 418 | 485 |
| Autodem 1234 .....      | 524 | 616 |
| In Modem.....           | 319 | 375 |
| 123 In Modem.....       | 409 | 481 |
| 1234 In Modem.....      | 512 | 600 |
| Pocket Modem.....       | 425 | 500 |

## NETCOMM MODEMS

|                         |     |     |
|-------------------------|-----|-----|
| Smartmodem 123SA.....   | 545 | 640 |
| Smartmodem 1234SA.....  | 685 | 804 |
| Smartmodem 21/23SA..... | 390 | 458 |
| Autodem 24/24 .....     | 454 | 534 |
| Autodem 123 .....       | 418 | 485 |
| Autodem 1234 .....      | 524 | 616 |
| In Modem.....           | 319 | 375 |
| 123 In Modem.....       | 409 | 481 |
| 1234 In Modem.....      | 512 | 600 |
| Pocket Modem.....       | 425 | 500 |

## PCs

|                                    |      |      |
|------------------------------------|------|------|
| Ultra XT's and AT's .....          | Call | Call |
| Mitac XT/AT/386s.....              | Call | Call |
| Toshiba laptops .....              | Call | Call |
| IBM PS/2 Personal Computers...Call | Call | Call |

## MICROSOFT

|                             |      |       |
|-----------------------------|------|-------|
| Mouse.....                  | \$86 | \$219 |
| Quick C Compiler.....       | 105  | 124   |
| Quick Basic.....            | 105  | 124   |
| Excel .....                 | 660  | 775   |
| Word .....                  | 492  | 578   |
| Windows 286 .....           | 124  | 146   |
| C Compiler.....             | 585  | 686   |
| Flight Simulator V. 3 ..... | 67   | 79    |

## LOTUS

|                            |       |       |
|----------------------------|-------|-------|
| Lotus 1-2-3.....           | \$525 | \$620 |
| Lotus Agenda.....          | 549   | 650   |
| Lotus Freelance Plus.....  | 598   | 699   |
| Lotus Manuscript.....      | 598   | 699   |
| Lotus Graphwriter II ..... | 598   | 699   |
| Lotus Symphony V2.0.....   | 808   | 950   |

## MONTHLY BITE

|                                                                                                     | ex<br>tax | inc<br>tax |
|-----------------------------------------------------------------------------------------------------|-----------|------------|
| dBase IV .....                                                                                      | 847       | 995        |
| <i>Microref Quick Reference Guides for Lotus, Multimate, WordStar, WordPerfect, dBase III .....</i> | \$29      | \$34       |
| <i>Games for IBM PC .....</i>                                                                       | from      | \$49       |
| <i>Microsoft Flight Simulator.....</i>                                                              | 67        | 79         |
| <i>Microsoft Mouse .....</i>                                                                        | 186       | 219        |
| <i>Q &amp; A Vers. 3 .....</i>                                                                      | 449       | 525        |
| <i>Harvard Graphics V. 2 .....</i>                                                                  | 499       | 585        |
| <i>Fujitsu DL5600 printer.....</i>                                                                  | 2645      | 3099       |
| <i>Sharp PC Projection Panel ....</i>                                                               | 1195      | 1399       |
| <i>Toshiba 40MB (25MS) disk .....</i>                                                               | 790       | 928        |

## LATEST RELEASE FROM LOTUS CORP. LOTUS AGENDA

For the management of people, projects and events .....\$549 \$650

We also offer:

- \* 24 hour delivery (most cases).
  - \* Bankcard/Mastercard accepted.
- Valid - November 1988.

## BORLAND BARGAINS

|                                | ex<br>tax | inc<br>tax |
|--------------------------------|-----------|------------|
| Turbo Pascal V5 .....          | \$152     | \$179      |
| Turbo Pascal Propak .....      | 252       | 296        |
| Turbo Pascal V.4 .....         | 105       | 124        |
| Turbo Assembler/Debugger ..... | Call      | Call       |
| Turbo C Vers. 2 .....          | 152       | 179        |
| Turbo C Propak .....           | 252       | 296        |
| Turbo C Vers 1.5 .....         | 105       | 124        |
| Turbo Basic .....              | 105       | 124        |
| Turbo Tutor.....               | 105       | 124        |
| Turbo Toolbox .....            | 116       | 135        |
| Quattro .....                  | 260       | 306        |
| Sidekick Plus .....            | 224       | 263        |
| Sprint.....                    | 232       | 273        |

## ASHTON TATE

|                               |       |       |
|-------------------------------|-------|-------|
| dBase IV .....                | \$847 | \$995 |
| dBase III+ (Prem. Pack) ..... | 710   | 835   |
| Multimate Advantage II .....  | 595   | 699   |
| Framework II .....            | 820   | 969   |

## BOARDS

|                                   | ex<br>tax | inc<br>tax |
|-----------------------------------|-----------|------------|
| Intel Above Board 286.....        | \$737     | \$866      |
| Intel Inboard 386/PC.....         | 1325      | 1559       |
| Hyperam Board (XT/512KB) .....    | 609       | 715        |
| Hyperam (AT/EMS/512KB) .....      | 650       | 763        |
| Hyperace 286 Plus 10MHz.....      | 550       | 645        |
| Hyperace 286 Superplus .....      | 730       | 855        |
| VEGA VGA.....                     | 510       | 599        |
| Everex Auto Switch (EGA) .....    | 240       | 282        |
| Everex Serial/Parallel Board..... | 95        | 112        |

## STORAGE SPECIALS

|                                 |       |       |
|---------------------------------|-------|-------|
| Toshiba 40MB V/C 25 ms .....    | \$850 | \$998 |
| Toshiba 72MB V/C 25 ms .....    | 1353  | 1590  |
| Seagate 20MB/Cont. 65 ms .....  | 416   | 489   |
| Seagate 30MB/Cont. 65 ms .....  | 459   | 539   |
| Seagate 40MB/Cont 40 ms .....   | 725   | 849   |
| PROCOM Ext 5.25" FDD .....      | 495   | 590   |
| PROCOM Ext 3.5" FDD .....       | 495   | 590   |
| PROCOM H/card 20MB 40ms... 679  | 795   |       |
| PROCOM H/card 45MB 25ms. 1242   | 1460  |       |
| Adaptec Controller (RLL) .....  | 135   | 155   |
| Colorado 44MB Tape Backup....   | 598   | 699   |
| Colorado 44MB (External) .....  | 783   | 926   |
| Rodime 43MB 28ms.....           | 800   | 940   |
| Microscience 80MB 28ms.....     | 1266  | 1488  |
| Plus Development Passport ..... | Call  | Call  |

## GENERAL SOFTWARE

|                                   |       |       |
|-----------------------------------|-------|-------|
| WordStar Pro 5 or 2000+ V.3...    | \$375 | \$445 |
| WordStar Easy Extra.....          | 130   | 153   |
| Xtree.....                        | 110   | 129   |
| Xtree Pro .....                   | 157   | 184   |
| Copy II PC .....                  | 54    | 63    |
| Clipper Compiler .....            | 699   | 822   |
| WordPerfect V. 5 .....            | 559   | 659   |
| Harvard Proj. Management.....     | 612   | 718   |
| Mirror II .....                   | 102   | 119   |
| Norton Advanced.....              | 184   | 216   |
| Norton Utilities V. 4.0 .....     | 114   | 134   |
| Timel. Project Manag. V. 3.0..... | 786   | 924   |
| Timel. Graphics.....              | 265   | 310   |
| Sideways .....                    | 99    | 116   |
| Tracker .....                     | 126   | 149   |
| Fastback Plus .....               | 208   | 245   |
| PFS First Choice .....            | 162   | 190   |
| PFS First Publisher .....         | 128   | 150   |
| Crosstalk Rel. 16.....            | 179   | 209   |
| PC Tools Deluxe .....             | 131   | 153   |
| Ventura V 1.1 .....               | 1247  | 1465  |
| Formtool.....                     | 199   | 235   |
| Typequick .....                   | 87    | 99    |
| Paradox.....                      | 815   | 955   |

Training available ■ Maintenance contracts available ■ Rentals available

**Call us for products not listed**  
**Tel: (03) 241-9111 Fax: (03) 824-0085**  
 52 Claremont Street, South Yarra, Vic., 3141.

# PACKET RADIO

one address and will deliver it to any other, without caring about the contents.

With packet networking, by wire or wireless, the message is spread over several packets. By keeping the packet size small, many messages can be interleaved within one carrier — a sorting office can cope with thousands of small envelopes at once, whereas one the size of an elephant in a machine that carried Christmas cards would cause problems.

Within the system, data is passed between nodes. Nodes look at the address field of a packet and retransmit it to other nodes which are closer to the eventual destination. Again, like a traditional letter mail system, where a sorting office routes a city's mail to sorting offices at the destination, these then take the sorting a stage further and do the actual delivering. This does mean that there has to be a certain level of intelligence in the nodes, but nothing out of the range of a simple microprocessor.

Packet systems are also sensitive to errors. If some electrical noise gets into a packet and makes it unreadable, then the node can spot this by comparing a numerical 'fingerprint' formed by the pattern of bits against one stored within the packet at the time it was transmitted. If the pattern it makes is different, then there has been some corruption in transit and it can ask for a retransmission.

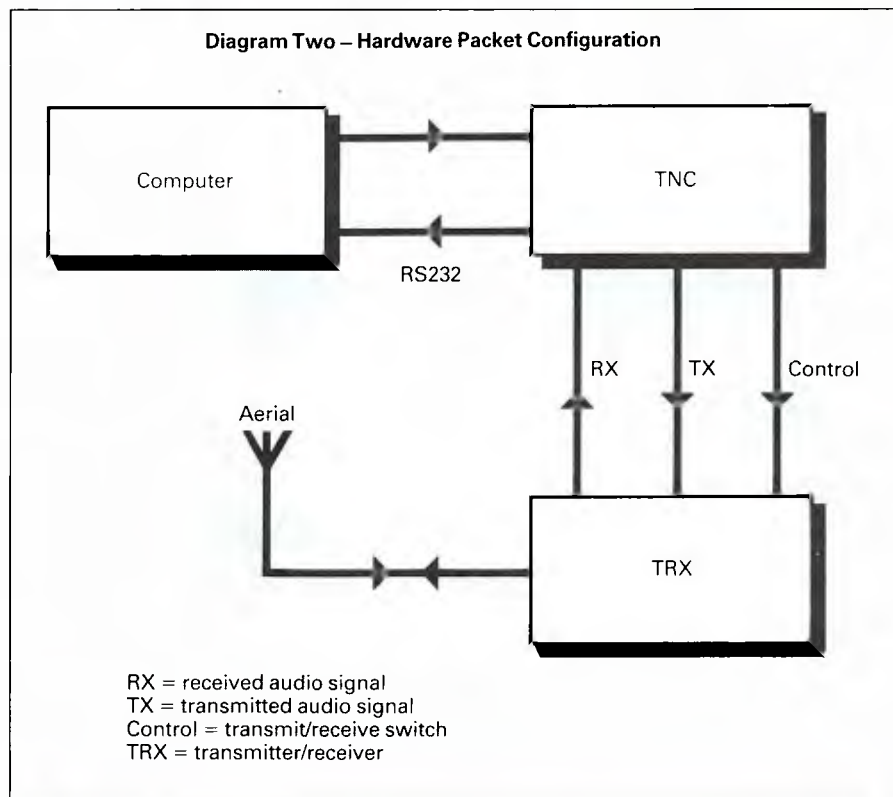
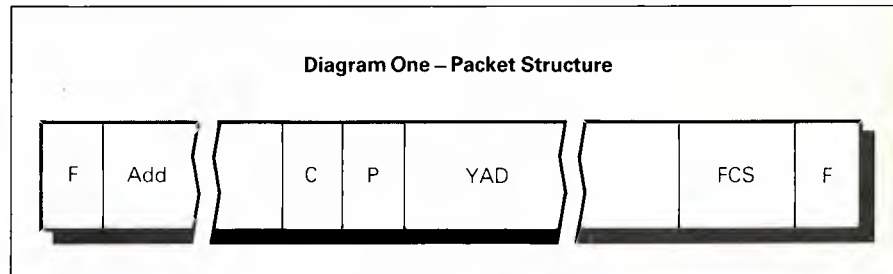
This slows things down a little because the fingerprint has to be transmitted along with the real data and because a complete retransmission takes time, but it is an effective guarantee against receiving incorrect data. And when the data has come across a city with airwaves polluted by electrically noisy things like dirty thermostats, dodgy plugs and computers, such a guarantee is essential.

In practice, the node that transmits a packet waits for a message confirming reception (called an acknowledgement, or 'ack') before sending the next one. If no such message is received, then it could be because the packet was so badly damaged it was ignored completely, or the ack was lost. After a suitable time, the packet is retransmitted until an ack finally gets through.

## Meeting standards

Of course, all the nodes and users in any packet system have to agree on many things. From the noises that correspond to the 1s and 0s of the raw, unadorned binary information, to the type of addressing to use, to the length of the packets themselves, everything has to be defined and constant.

Packet radio uses either close adapta-



## Key for Diagram One . . .

**F** = Flag byte. This is a unique pattern of bits that identify the start and end of the transmission, so the receiver knows when to start and stop decoding the intermediate information.

**Add** = Address. The callsign of the final recipient, plus some optional extra callsigns that comprise the route between the sender and the recipient. For example, if the address field has G6HVV G4WIK G6HQW G3ZZZ then G6HVV will relay the info to G4WIK, who will send it to G6HQW, who will retransmit it to G3ZZZ, the intended recipient. If G3ZZZ were in range of the original transmitter, then his callsign would be the only one in the address field.

**C** = Control Field. Information held in

the rest of the packet — general transmission, disconnection request, specific information.

**PID** = Protocol IDentifier. Information to help the recipient decode the data in the YAD field — it is a request to open a link, mail information, and so on.

**YAD** = Your Actual Data. This is the information that is transmitted. Everything else in the packet exists to keep the network working — this is real data.

**FCS** = Frame Checksum. A number, created by adding together (or some similar operation) all the other data bytes in the packet. Used to check correct reception.

**F** = Flag. Another flag byte. Signals end of the packet.

tions of, or identical protocols to, the commercial world — the modem tones are Bell standard, and the AX.25 packet

structure is highly similar to X.25 (the international standard). All this means that packet radio equipment can be built out



of the bits used by commercial people like Telecom. But where Telecom charges thousands of dollars for the equipment to hook into PSS directly, a radio node (called a TNC, or Terminal Node Controller) can cost under a couple of hundred — and it does much the same job.

One of the joys of being a radio amateur is the freedom to experiment. Whereas any attempt to hook a home-made, high-speed modem into the telephone system is met with hard stares from The Powers That Be, radio hams are encouraged to do what they like. It is, after all, impossible to electrocute a telephone engineer via the wireless (al-

though experiments are in progress).

Basic competence in electrical, electronic and operating theory is assumed by a reasonably simple test called the Amateur Operators Certificate of Proficiency (AOCP) or the Amateur Operators Limited Certificate of Proficiency (AOLCP), the passing of which means that the new radio ham is at least aware of the frequencies and powers permitted, and is capable of solving interference problems.

### *No screening standards*

Interference is indeed one of the biggest problems — computers can, if poorly

designed, radiate a wide range of frequencies jamming all but the strongest signals. Most countries have standards of screening which computers have to meet before they can be sold, but not in Australia. This means that computers designed for our market can be as noisy as they like. There's no way that the owner of a computer which is jamming a kilometre away can be made to do anything about it.

Problems in the other direction, where a radio signal interferes with the operation of a computer, are also common, although the amateur radio station can be closed down while the problem is sorted out.

Apart from interference issues, using packet is almost as simple as using a telephone modem. The TNC looks similar, and plugs into the computer by a standard RS232 serial cable. Ordinary communications software can be used too; like Hayes-standard modems, the TNCs accept commands typed in at the computer keyboard until a call is going, when they pass information through.

The TNC plugs into a radio transmitter/receiver (called a transceiver, or a rig) and controls the transmit/receive switchover. Unlike a telephone circuit, where both ends of the conversation can talk at once and still hear each other, most radio contacts are strictly one way at a time. This doesn't matter with TNCs, as the sender only has to listen when it has finished transmitting a packet.

### *Setting up*

When all the connections have been made, a few things need to be set up. The TNC has to be told the call-sign of the station — every licensed radio ham in the world has a unique call-sign. The TNC has to know this both to identify transmissions (a legal requirement — if the local police radio is wiped out by a faulty rig they appreciate being able to find the culprit quickly) and to form a convenient address for incoming packets. One of the necessities of maintaining a packet network is a systematic allocation of addresses — the radio amateur fraternity sorted this out about fifty years ago.

Then a frequency has to be chosen. The most commonly used amateur band in Australia is 147.575MHz. Also known as two metres (the wavelength), or just '2', this frequency is between VHF, FM broadcasting and the massed bands of the taxi radios, and, like them, most useful for short-distance work (80 kilometres is common). The aerials are small, the equipment inexpensive and the level of activity high. It's possible to get going on 2 with a DIY kit costing around \$200

# STOP BEFORE YOU SIGN . . .

## **FBS** COMPUTER QUOTE AUDIT SERVICE COULD SAVE YOU \$1000's . . .

FLANOUR BUSINESS SYSTEMS can guarantee objectivity because we act as computer consultants to our clients, not as sales agents for Hardware and Software suppliers.

We deal with a wide variety of software packages.

Because we are not tied to any one Software or Hardware vendor, we are able to objectively evaluate your computer requirements, and recommend and install the solution that best supports your business needs.

We can even tailor packages exclusive to your needs should your require it.

So don't buy the best Salesman, ensure you get completely independent advice.

**CALL TOM BERKOVITS TODAY —**

**32 9855**

**BEFORE ITS TOO LATE!**



**FLANOUR BUSINESS SYSTEMS**

Level 5, Edgecliff Centre  
203-233 New South Head Road  
Edgecliff, NSW 2027

(passing the AOC or AOLCP implies a person has the nous to build such kits), and second-hand transceivers covering the full band start from around \$200.

A lot of things happen on 2; mostly voice contacts, but there is some morse, an area for satellite communication and special frequencies for long-distance specialists (DXers). Packet people have a couple of frequencies, one for general calling, establishing contacts and using the many packet bulletin boards (PBBS) and one for more personal, station-to-station nattering. Within a few minutes of plugging in and tuning to 147.575MHz (the first frequency), a new user within a few kilometres of any centre of population should be seeing some traffic (see the box alongside).

## Is this working?

And it all looks incomprehensible. Because radio amateurs as a breed are not scared of rolling up their sleeves and digging into technical details, the commercially available TNCs display as much information on the packets that fly about as one could want. (In systems such as Telecom's PSS network, great pains are taken to hide the routing information from users who just want a reliable, invisible link from A to B.) The packet radio network is still experimental, and the users still keen on the technology, so all the details are there. The TNC can be instructed to hide the information away, when the user is more confident of what's happening.

A typical line of information is:

```
VK3RPA>VK3YPK-1, VK3RPA-1*
[MBL-5.12-$]
VM3RPA MPRG HF/VHF WA7MBL
/TCPIP/OPUS Mail Gateway.
VK3RPA MPRG BBS>
```

This shows that your TNC has received a packet being transmitted from station VK3RPA (this station is a bulletin board) to station VK3YPK-1. And in the middle is VK3RPA-1, who is acting as a relay because the other two stations can't directly communicate. This relay function, called digipeating (short for digital repeating) is very important to packet radio. It's completely automatic, and is a way of 'borrowing' another station for a few seconds to retransmit a packet to or from your station. The usual way to make a connection on packet radio is to give the TNC a command like:

```
CONNECT VK3CCT
```

This tells the TNC to transmit a packet addressed to VK3CCT and wait for an

```
VK3CDE>VK3YNV, VK3RMU*, VK3RGV <UA R F>
VK3CDE>VK3YNV, VK3RMU, VK3RGV <RR C P RO>
VK3CDE>VK3YNV, VK3RMU*, VK3RGV <RR C P RO>
VK3YNV>VK3CDE, VK3RGV, VK3RMU*, <RR R F RO>
VK3CDE>VK3YNV, VK3RMU, VK3RGV <I C P SO RO>:
[MBL-5.12-$]
```

Bob's BBS, Melbourne  
VK3CDE BBS>

```
VK3CDE>VK3YNV, VK3RMU*, VK3RGV <I C P SO RO>:
[MBL-5.12-$]
```

Bob's BBS, Melbourne  
VK3CDE BBS>

```
VK3YNV>VK3CDE, VK3RGV, VK3RMU* <RR R F R1>
VK3YNV>VK3CDE, VK3RGV, VK3RMU* <I C P SO R1>:
[MBL-5.12-$]
```

```
VK3CDE>VK3YNV, VK3RMU*, VK3RGV <RR R F R1>
VK3CDE>VK3YNV, VK3RMU, VK3RGV <RR C P R1>
VK3CDE>VK3YNV, VK3RMU*, VK3RGV <RR C P R1>
VK3YNV>VK3CDE, VK3RGV, VK3RMU* <RR R F R1>
VK3CDE>VK3YNV, VK3RMU, VK3RGV >I C P S1 R1>:
```

```
VK3CDE>VK3YNV, VK3RMU*, VK3RGV <I C P S1 R1>
```

```
VK3YNV>VK3CDE, VK3RGV, VK3RMU* <RR R F R2>
VK3YNV>VK3CDE, VK3RGV, VK3RMU* <I C P S1 R2>:
SP VK5AGR @ VK5WI < VK3CUE
```

```
VK3CDE>VK3YNV, VK3RMU, VK3RGV <RR R F R2>
```

*A few minutes on packet . . .*

acknowledgement packet in return. The TNC waits for the frequency to be clear, and then squirts off the message.

If after a few seconds no reply has been received, the TNC retransmits the original packet on the assumption that the frequency was in use by another station. After a few attempts, the machine gives up since VK3CCT is turned off or not within range. However, if station VK3XP is closer, then the call can be sent as:

```
CONNECT VK3CCT VIA VK3XP
```

This makes the TNC send a similar request to VK3CCT, but to include some routing information so that VK3XP will retransmit it, if it receives the packet. Likewise, any reply from VK3CCT sent to VK3XP will be passed on to the TNC. This means that if VK3XP (sorry about all the alphabet soup — amateur radio gets like this sometimes) has a sparrow-scorchingly powerful transmitter perched on top of a tall hill, and you've got a battery-powered pocket-sized rig in a ditch, you can use his superior setup as if it were yours.

He doesn't have to be in the room, and if he is he can carry on using his radio and TNC for his own contacts without

even realising that, in between his packets, his TNC is slotting in a completely separate conversation. The separate addresses on each packet ensure that there is no mix-up of conversation or data.

## Repeat after me

It gets better. Up to eight stations can be involved in one contact, so this message:

```
CONNECT VK3KAW VIA VK3RMU,
VK3RGV, VK3RPM, VK3RPG
```

will attempt to set up a connection to VK3KAW via the other four stations. Assuming that each station can make a contact within about 80km, then the contact chain could stretch 400km. And the station that sets it all up can be a small, home-made effort which, by itself, would have trouble getting eight kilometres across town.

However, such long chains seldom exist. Sending a packet and receiving an acknowledgement need a clear run through all the stations, and even a moderately busy frequency will make such an occurrence rare. All it takes is



# The CRYSTAL Expert Systems Shell

- Delivers Rapid Development
- Short Learning Time
- Productive Applications
- Locked Runtimes Even for XT's
- OS/2 Native Mode Versions NOW
- The UK Health Service Performance Analyst
- The Crystal City Real-Time Dealing System
- The Victorian Governments Business Licence System

Demonstration discs and application advice available from the sole Australian representatives...

**Oxford Systematics**

PO 126 Heidelberg Vic 3084  
Ph: (03) 459 9671  
Fax: (03) 459 8663

## PACKET RADIO

one other station within the 400km range to try and transmit a packet at the same time, and your packet will need to be retransmitted.

### *Pass the message*

Bulletin Boards (PBBS) are another aspect of packet radio which greatly enhances the system. They are very similar in concept and practice to the telephone bulletin boards that modem users know and love, but without the phone bill.

The first time you make contact, the PBBS will ask for your first name; thereafter it will know which messages you've read and also hold private mail for you sent by other amateurs. There's no real security on packet radio, as all packets can be monitored by any station within reception range, but messages addressed to a particular amateur are not tampered with.

A PBBS usually carries about 200-300 active messages, depending on the kind of computer it is being run on. IBMs are the most common, but Commodore 64s, Amigas, BBCs and even Spectrums can be found. A station connected to a PBBS can do the usual bulletin-boardish functions of reading a selection of messages and scanning down the titles to winkle out the interesting ones.

Most of the messages are about packet or other aspects of amateur radio, but some stations carry on games of packet chess, talk computers or discuss music. Also, like wired BB, a user can up and download program and data files and send messages to other users — not just users on the one PBBS, either.

Every PBBS in Australia is linked by a small number of PBBSs operating on the HF bands. This is an automatic forwarding and message-routing system designed, implemented and maintained by the PBBS system operators themselves, and is one of the more impressive examples of amateur co-operation.

Sending a message to another user anywhere in the country is just a matter of addressing it with a tag of the user's local PBBS. My local board is VK3RPA, so any amateur could send me a message by connecting to another board, addressing the message as VK3AVE@VK3RPA, and during the small hours it will be sent from PBBS to PBBS until it arrives at the destination, where it will wait until I next connect. The chain of stations that the message has been passed through is given at the top of the text. It's similar to the Fido system used by phone-bound computer users, but it would be cruel to mention phone bills again.

Messages can also be addressed to

ALL, whereupon the text is percolated through the entire system onto the boards. This makes it unnecessary to use more than one PBBS, which reduces channel congestion caused by curious PBBS hunters.

### *Across the globe*

For reasons which seem half historical and half practical, the frequencies on which long-distance international operation is common are limited to the amateurs who also pass a Morse code test. Until recently, the many amateurs who didn't want to learn the code were mostly limited to Australian contacts, but packet radio has changed that too.

Links further afield, out of the country, across the globe or further, are provided by gateway stations. These have a TNC on the standard frequency, but may have one or more on shortwave (HF as it is now called), or operating a different sort of digital communication altogether. Intercontinental links are more commonly made with a system called AMTOR, a digital protocol that has much shorter packets and a much more robust error-detection system. HF is prone to fading, distortion and a whole mishmash of interfering signals, and packet is not designed for such conditions. The chance of getting a set of 300 bytes across without mishap is too low.

With an AMTOR-equipped gateway station though, any packet user can make contact on the two metre TNC and go through to the HF link. Again, it's possible to do this from that little station in a shoebox and the coat-hanger aerial in the attic.

### *Conclusion*

Packet is exciting. It's also suffering from an explosive growth in interest, as the entire Australian structure has increased over the past two or three years. In big cities it's almost bursting at the seams, as new stations pop up on the main calling frequencies daily. Plans are afoot for high-speed intercity microwave links to cope with the amount of bulletin board traffic, and special modems are being designed to this end.

But it's refreshing to find an area of microcomputing that's growing as fast as the computers themselves did in the old days, an area with a large and friendly group of users and with the capability to give them the world. If you don't get excited by global digital communication from home-made, inexpensive equipment then there's always knitting; the rest of us will be pottering around in high earth orbit.

END

# NEW FROM LOGITECH ScanMan™

## Affordable scanning power at your fingertips

Introducing ScanMan, the hand-held scanner for users who need to add graphic images to their computer documents, but didn't think they could afford a scanner. LOGITECH's newest personal peripheral lets documents created on your IBM PC, XT, AT, PS/2 or compatible have that polished look that only graphics can give.

Don't let the low price fool you. LOGITECH's ScanMan offers the largest hand-held scanning window available: a full four inches. (Most scanners only offer 2.5 inches). Graphics are scanned directly to the powerful ScanWare™ Graphics Editor, where a full range of paint utilities and tools are available for editing the scanned image.

ScanMan combines power and flexibility in one neat package. Thanks to our ScanWare software, ScanMan offers you more options than any other scanner on the market today. Scan directly to our powerful graphics editor, directly to a file, or to an MS Windows™ clipboard using our WinScan™ utility.

You can scan photographs, newspaper and magazine articles, books, drawings, logos and business cards. Scanned images may be stored and used in many of the most popular applications, including: LOGITECH Publisher, LOGITECH PaintShow™, Aldus PageMaker™, Ventura Publisher™, PFS: First Publisher™, ZSoft PC Paintbrush™, and many, many more.

**LOGITECH**  
Personal Peripherals. Worldwide.

**Corporate Headquarters**  
Logitech, Inc.  
6505 Kaiser Dr.  
Fremont, CA 94555  
Tel: (415) 795-8500

**European Headquarters**  
Logitech SA  
CH-1122 Romanel/Morges  
Switzerland  
Tel: ++41(0)21-869-96-56

**Far East Headquarters**  
Logitech Far East Ltd.  
15 R&D Road 2  
Science Based Ind. Park  
Hsinchu, Taiwan, ROC  
Tel: 886-35-77-8241

© 1988 Logitech, Inc. All rights reserved. IBM and IBM PC AT are registered trademarks and IBM PC XT and PS/2 are trademarks of International Business Machines Corporation. Microsoft is a registered trademark and MS Windows is a trademark of Microsoft Corporation. LOGITECH, ScanMan, ScanWare, and WinScan are trademarks of Logitech. Printed in the U.S.A. DSR10A0488

**Australian Distributor:**

**B.J.E. Enterprises Pty Limited**  
35 West Parade, Eastwood NSW 2122  
Tel: (02) 858 5611 Fax: (02) 858 5610





# MICROLAND

AUSTRALIA'S NO. 1

**SYDNEY** TEL: (02) 3317474  
FAX: (02) 3317499

**MELBOURNE** TEL: (03) 4197788  
FAX: (03) 4191414

## Stock Clearance Sale

**MS WORD 4.0  
WITH FREE PAGEVIEW \$495**

**SUPERCALC 4 \$270**

**D BASE III PLUS  
PREMIUM PACK \$795**

**LOTUS 123 + VALUE PACK  
& FREE LOTUS METRO \$595**

**SYMPHONY VER. 2.0 \$875**

**LOTUS AGENDA \$555**

**FRAMEWORK III \$875**

**MULTIMATE ADV \$670**

**QUICKSILVER  
DBASE III COMPILER \$690**

### SOFTWARE

#### LOTUS SOFTWARE

|                        |       |
|------------------------|-------|
| Lotus 123.....         | \$595 |
| Lotus Hal.....         | \$195 |
| Symphony Ver. 2.0..... | \$875 |
| Manuscript.....        | \$685 |
| Graphwriter II.....    | \$685 |
| Freelance Plus.....    | \$645 |
| Lotus Agenda.....      | \$555 |

#### MICROSOFT SOFTWARE

|                            |       |
|----------------------------|-------|
| Excel.....                 | \$720 |
| Flight Simulator V3.....   | \$85  |
| Learning Dos.....          | \$85  |
| Multiplan.....             | \$295 |
| Project.....               | \$575 |
| Quick Basic.....           | \$115 |
| Quick C.....               | \$115 |
| RBase System.....          | \$990 |
| Windows 286.....           | \$150 |
| Word 4.0/Pageview.....     | \$495 |
| Works.....                 | \$290 |
| Mouse.....                 | \$190 |
| C compiler.....            | \$655 |
| Fortran compiler.....      | \$655 |
| Macro Micro-assembler..... | \$230 |

#### BORLAND PRODUCTS

|                            |        |
|----------------------------|--------|
| Turbo C 2.0.....           | \$CALL |
| Turbo Pascal 5.0.....      | \$CALL |
| Turbo Prolog 2.0.....      | \$CALL |
| Turbo Basic 1.1.....       | \$CALL |
| Turbo Assembler/Debugger.. | \$CALL |
| Quattro.....               | \$285  |
| Sidekick Plus.....         | \$285  |
| Sprint.....                | \$295  |
| Developers Library.....    | \$435  |

#### DIGITAL RESEARCH

|                            |       |
|----------------------------|-------|
| Gem Draw Plus.....         | \$385 |
| Gem Graph.....             | \$385 |
| Gem Presentation Team..... | \$645 |
| Gem Desktop Publisher..... | \$385 |
| Gem Wordchart.....         | \$260 |
| Gem Scan.....              | \$195 |
| Concurrent DOS.....        | \$385 |
| Concurrent DOS 386.....    | \$520 |
| Programmers Toolkit.....   | \$260 |

#### MAC SOFTWARE

|                          |        |
|--------------------------|--------|
| Mac Money.....           | \$235  |
| Quick Keys.....          | \$195  |
| Quick Mail.....          | \$540  |
| Disk Top.....            | \$125  |
| Focal Point.....         | \$220  |
| Foxbase Plus/Mac.....    | \$860  |
| Soft PC.....             | \$895  |
| Reports - Hypercard..... | \$220  |
| Draw It Again Sam.....   | \$270  |
| Microsoft Range.....     | \$CALL |

#### COMMUNICATION

|                           |        |
|---------------------------|--------|
| Supercom V3.....          | \$152  |
| Brooklyn Bridge V2.0..... | \$215  |
| Mirror II.....            | \$115  |
| Softerm PC.....           | \$CALL |
| Carbon Copy Plus.....     | \$275  |
| Crosstalk.....            | \$215  |
| PC Anywhere.....          | \$195  |
| Smarterm 220.....         | \$310  |
| Smarterm 240.....         | \$520  |

#### WORD PROCESSING

|                       |       |
|-----------------------|-------|
| Multimate ADV II..... | \$670 |
| Wordperfect 5.0.....  | \$635 |
| M/S Word V4.....      | \$495 |

|                            |       |
|----------------------------|-------|
| Wordstar 2000 Plus V3..... | \$440 |
| Wordstar 4.0.....          | \$399 |
| Extra Easy.....            | \$80  |
| Manuscript.....            | \$685 |

#### \*DATABASE

|                      |       |
|----------------------|-------|
| DBXL Ver. 1.2B.....  | \$285 |
| Foxbase Plus.....    | \$650 |
| D Base III Plus..... | \$795 |
| Paradox 2.0.....     | \$935 |
| Q & A V3.....        | \$510 |
| Reflex.....          | \$185 |
| RBase system.....    | \$990 |
| Genifer.....         | \$475 |
| Quicksilver.....     | \$690 |

#### INTEGRATED

|                     |        |
|---------------------|--------|
| Ability Plus.....   | \$240  |
| Framework III.....  | \$875  |
| Open Access II..... | \$985  |
| Symphony V2.0.....  | \$875  |
| First Choice.....   | \$190  |
| M/S Works.....      | \$295  |
| Smart 3.0.....      | \$CALL |

#### GRAPHICS/CAD

|                          |        |
|--------------------------|--------|
| Inset.....               | \$195  |
| Harvard Graphics.....    | \$575  |
| Freelance Plus.....      | \$670  |
| Designcard V3.....       | \$550  |
| Autosketch.....          | \$149  |
| Autosketch Enhanced..... | \$179  |
| Magician.....            | \$345  |
| Ventura.....             | \$CALL |
| Pagemaker.....           | \$CALL |

#### PROJECT MANAGEMENT

|                  |       |
|------------------|-------|
| Timeline.....    | \$625 |
| Timeline V3..... | \$895 |

|                             |       |
|-----------------------------|-------|
| Harvard Project MGR II..... | \$745 |
| Microsoft Project.....      | \$575 |
| Super Project Plus.....     | \$660 |

#### UTILITIES

|                           |       |
|---------------------------|-------|
| Above Disc.....           | \$220 |
| PC Alien.....             | \$89  |
| Smartkey.....             | \$68  |
| XTree.....                | \$98  |
| XTree Pro.....            | \$180 |
| PC Tools Deluxe.....      | \$115 |
| Take Charge.....          | \$220 |
| Norton Utilities.....     | \$125 |
| Norton Advanced.....      | \$195 |
| Norton Editor.....        | \$115 |
| Norton Guides.....        | \$132 |
| Norton Commander II.....  | \$125 |
| 101 Macros.....           | \$105 |
| Bookmark.....             | \$195 |
| Mace 4.1.....             | \$175 |
| Print Q.....              | \$220 |
| Sideways.....             | \$108 |
| Printworks.....           | \$135 |
| Typequick.....            | \$85  |
| Disc Technician.....      | \$165 |
| Disc Technician Plus..... | \$210 |
| Form Tool.....            | \$250 |
| Fast Back Plus.....       | \$230 |

#### ACCOUNTING

|                          |        |
|--------------------------|--------|
| DAC Easy Accounting..... | \$195  |
| DAC Easy Tutorial.....   | \$49   |
| Attache 4.....           | \$CALL |
| Attache Modules.....     | \$CALL |
| Sybiz Plus.....          | \$CALL |
| SBT Multiuser.....       | \$CALL |
| Sage Accountant.....     | \$420  |
| In House Accountant..... | \$115  |

### HARDWARE

#### NETCOMM MODEMS

|                       |       |
|-----------------------|-------|
| 1200 In Modem.....    | \$395 |
| 2400 In Modem.....    | \$475 |
| 123 In Modem.....     | \$445 |
| 1234 In Modem.....    | \$575 |
| Auto Modem 21/23..... | \$375 |
| Auto Modem 123.....   | \$480 |
| Smart 21/23 SA.....   | \$450 |
| Smart 1200 SA.....    | \$519 |
| Smart 2400 SA.....    | \$715 |
| Smart 123 SA.....     | \$620 |
| Smart 1234 SA.....    | \$780 |
| Pocket Modem.....     | \$490 |

#### MONITORS

|                         |        |
|-------------------------|--------|
| NEC Multisync II.....   | \$1080 |
| NEC Multisync Plus..... | \$CALL |

|                              |        |
|------------------------------|--------|
| NEC Multisync XL.....        | \$CALL |
| Taxan 770 +.....             | \$1180 |
| E120 8060 Flexscan.....      | \$1295 |
| ECM EGA Monitor.....         | \$695  |
| Teko EGA Monitor.....        | \$695  |
| ADI DM 12 Monochrome.....    | \$195  |
| ADI DM 14 Monochrome.....    | \$220  |
| Thomson Composite.....       | \$160  |
| Phillips 14" Monochrome..... | \$240  |
| Phillips 14" EGA.....        | \$750  |

#### VIDEO BOARDS

|                            |       |
|----------------------------|-------|
| Mono Card.....             | \$110 |
| EVA 480 EGA.....           | \$300 |
| Everex Micro Enhancer..... | \$350 |
| Vega EGA.....              | \$360 |

|                          |        |
|--------------------------|--------|
| Vega Deluxe.....         | \$450  |
| Vega VGA.....            | \$490  |
| Vega Vram.....           | \$1395 |
| Genoa Super Hires.....   | \$459  |
| Genoa Super Hires +..... | \$475  |
| Genoa VGA.....           | \$649  |
| Paradise VGA.....        | \$550  |

#### HARD DRIVES

|                               |       |
|-------------------------------|-------|
| Seagate 20Mb + Cont.....      | \$485 |
| Seagate 30Mb + Cont.....      | \$520 |
| Miniscribe 20Mb.....          | \$395 |
| Miniscribe 30Mb + Cont.....   | \$550 |
| Miniscribe 40Mb.....          | \$550 |
| Control Data 40Mb V/Coil..... | \$895 |
| Toshiba 44Mb V/Coil.....      | \$980 |

|                         |        |
|-------------------------|--------|
| Plus 20Mb Hardcard..... | \$1095 |
| Plus 40Mb Hardcard..... | \$1245 |

#### PRINTERS

|                        |        |
|------------------------|--------|
| NEC P7.....            | \$1080 |
| NEC P5200.....         | \$920  |
| NEC P5300.....         | \$1395 |
| Ultra Printer.....     | \$355  |
| Star NX1000.....       | \$490  |
| Toshiba P321SL.....    | \$CALL |
| Toshiba P341SL.....    | \$CALL |
| Toshiba P351SX.....    | \$CALL |
| Diconix Portable.....  | \$850  |
| Xerox 4020 Inkjet..... | \$2695 |
| HP Deskjet.....        | \$CALL |

## EPSON P<sub>C</sub>e XT

360K FDD, 640K RAM, SERIAL,  
PARALLEL PORTS, 20MB HARD DISK,  
MONO CARD, HI-RES MONO SCREEN  
WITH TILT/SWIVEL BASE. DOS + BASIC.

**\$ CALL**

**PLUS \$1200 FREE PERFECT SOFTWARE**

## EPSON AX2 12MHZ

SUPERB QUALITY & RELIABILITY AT  
SUPER REALISTIC PRICES.

20MB, 40MB, MONO, EGA OR PGA

**CALL FOR AUSTRALIA'S BEST  
PRICES. WE WILL NOT BE BEATEN!**

# EPSON

## FULL RANGE

**CALL FOR BEST  
PRICES**

# AST

RESEARCH INC.  
PREMIUM 286. 10MHZ. 'O' WAIT

1MB FASTRAM + EXPANDED MEMORY  
WINNER - PC OF THE YEAR AWARD - USA

**FROM: \$3295**

**WE WILL NOT  
BE BEATEN  
ON PRICES**

# CALL

### INTEL MATHS CO-PROCESSORS

|         |       |          |        |
|---------|-------|----------|--------|
| 8087    | \$205 | 80287-8  | \$460  |
| 8087-2  | \$290 | 80287-10 | \$540  |
| 8087-1  | \$395 | 80387-16 | \$895  |
| 80287-6 | \$310 | 80387-20 | \$1295 |

**WITH FULL 5 YEAR WARRANTY**

### TAPE BACK UP UNITS

|                       |        |
|-----------------------|--------|
| COLORADO 44MB INT.    | \$Call |
| COLORADO 44MB EXT.    | \$Call |
| CIPHER 5400 60MB EXT. | \$1495 |
| ULTRA 40MB INTERNAL   | \$595  |

# NEC

**MULTISYNC II  
MULTISYNC PLUS  
MULTISYNC XL**

**CALL FOR SPECIAL PRICES!**

## TOSHIBA PRODUCTS

**CALL FOR BEST PRICES  
NEW PRODUCT RELEASE**

T1600 - 80286-12MHZ, BACKLIT,  
20MB, 1MB-5MB RAM,  
EGA, BATTERY OR MAINS

T5200 - 80386, 20MHZ, 100MB HD  
A PORTABLE FILESERVER!



## WYSE XT

PCXT - 1 X 360K FDD 640K RAM,  
20MB HD. Serial/parallel ports,  
101 keyboard, mono card, mono  
screen, DOS and Basic.

**\$2,395**

**INCLUDING \$1200 FREE  
PERFECT SOFTWARE.**

## TURBO XT **ULTRA** TURBO AT COMPUTERS

**\*ABSOLUTELY FREE!  
\$1200 WORTH OF PERFECT  
SOFTWARE WITH ULTRA XTs**

A XT 20MB MONO SCREEN  
B XT 20MB EGA SCREEN  
C XT 30MB MONO SCREEN  
D XT 30MB EGA SCREEN

Fully supported by  
IMAGINEERING  
12 months Australia-  
wide warranty by  
HONEYWELL

**\*ABSOLUTELY FREE!  
\$1200 WORTH OF PERFECT  
SOFTWARE WITH ULTRA ATs**

A AT 20MB MONO SCREEN  
B AT 20MB EGA SCREEN  
C AT 40MB MONO SCREEN  
D AT 40MB EGA SCREEN

**CALL FOR AUSTRALIA'S NO. 1 PRICES**

### FUJITSU PRINTERS SALE

|        |        |        |        |
|--------|--------|--------|--------|
| DX2300 | \$749  | DL3300 | \$1049 |
| DX2400 | \$975  | DL3400 | \$1195 |
| DL2400 | \$1349 | DL5600 | \$2950 |
| DL2600 | \$1795 |        |        |

**LIMITED STOCKS!  
HURRY!**





**Allaw solves the puzzle. Novell runs on ESDI and RLL drives.**

### The one-stop networking shop

At last there is a networking specialist company which sells and supports all the required software and hardware components for your networking needs. Allaw Sales. And we offer a multitude of solutions like the new **On-track** disk management - N Software which, with standard **Western Digital** controllers, allows you to run Novell on ESDI and RLL drives.

Big drives like the top-end **Miniscribes** can now work on **Novell** which means big \$ savings in implementation and big time savings in installing.

Why not give us a call and find out how Allaw, through its dealer network, can provide all your networking requirements. From two p.c.'s to 200 depend on us for equipment selection, installation and on-going systems support. Now networking your p.c.'s is not as puzzling as you perhaps think.

Allaw Sales Pty. Ltd.,  
1/1 Short Street,  
Chatswood, NSW 2067.  
Tel: (02) 406 9111 Fax: (02) 406 9115  
P.O. Box 541, Willoughby, NSW 2068  
Melbourne: (03) 211 8911  
Brisbane: (07) 854 1461  
Auckland: (09) 371 334



**NETWORKS  
THAT  
WORK**



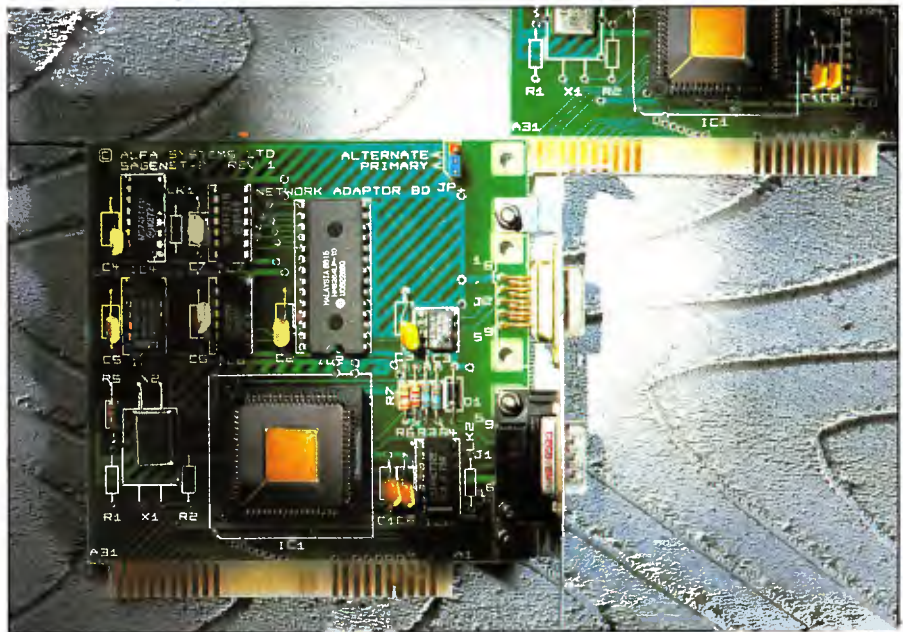
# MainLan

***Low-cost networks sound like a good idea, but most are neither easy to use nor renowned for their reliability. In SageSoft's MainLan, however, Andy Redfern has found a potential standard network for the future, which is working well right now.***

The news that SageSoft was launching a new network aroused two opposite emotions in me. I was pleased to hear that the reasonable performance of Sagenet was to be improved upon, but I was very worried that my editor would ask me to review it. He *did* ask me — and I was pleasantly surprised at how painless this task turned out to be.

The main problem with networks is that they need to operate most of the hardware in the machine directly, just to get a reasonable performance. The corporate-priced networks like Novell and Torus overcome these problems by requiring one machine to be a dedicated file server. This allows them the use of all the machine's memory and removes the worry about what any application programs might be up to. That makes the network very expensive to install and has the psychological disadvantage that the most powerful machine in the office appears to be unused.

In the August issue of *APC*, Guy Swarbrick and I reviewed a number of low-cost networks, none of which required a dedicated file server. We only described three networks: the other three we tried just wouldn't function sensibly enough for us to write a decent review. Even the packages we did review wouldn't all work on the same combination of machines. This is why it was with some trepidation that I ap-



proached another networking product.

MainLan from SageSoft is a revolutionary way of operating in a multiple-machine environment without having to make all the usual sacrifices. In fact, the only real problem I encountered was that the pre-release boards I was using were not as well made as the final version of the boards will be. They had a tendency to work the cables loose, causing data to be lost and transfers to be stopped.

To have called this product 'Sagenet 2' would have been a mistake as it is a totally new product with superior capabilities.

## Hardware

As with the Sagenet system, both the hardware and the software were designed by Alfa Systems. Both Alfa and Sage have learnt from their first venture



# Setting up the new MainLan network. (By Timothy. Aged 13 1/4.)



**W**hen I first heard about computer networking I was a little confused. Discovered that all it means is that all your computers, including all the information within them, and all your printers are all linked up to each other and shared by everyone on the network.

**S** Personally, I always thought computers were supposed to do things like that anyway. They obviously don't though, and Father thought it was time that his company's should. Perhaps he's right for once.

**SATURDAY SEPTEMBER 3rd. 11.30 a.m.**  
Business must be going very well at the moment. Without as much as a second thought Father has just spent £199 on each PC for this new network called MainLan. Why he has roped me into setting it up for him though, I have no idea.

MainLan is obviously meant for smaller businesses. It comes complete with everything you

**A** need, and a surprisingly simple guide that tells you exactly how to put it all together. It all looks so easy, I am sure that even Father could do it.

**SATURDAY SEPTEMBER 3rd. 12.35 p.m.**

That didn't take long to set up. Still no sign of Father. I fully expect him to be in the Three Horseshoes by now. I think it is time to explore the fruits of my labour.

**SATURDAY SEPTEMBER 3rd. 2.55 p.m.**

Now I know why Father insisted on the MainLan network. I have been playing with it for quite a while and it really is stacked full of features. I am sure they could charge an awful lot more for it.

**G** What has also amazed me is that it is so easy to understand. The software is written in ordinary, everyday English and a very simple menu quite literally leads you through the program.

They use Lotus software here, but the manual tells me that MainLan works quite happily with other leading makes of software.

**F** Father is back. I am pleased to see that he is not taking advantage of the new licensing laws. He'll be pleased with MainLan. He'll be able to understand it. I wonder if he'll increase my pocket money. I doubt it.

For a free guide to networks and how they work, plus a demonstration disk about MainLan in particular, simply post this coupon to: Dept. 99, SageSoft, NE1 House, Regent Centre, Newcastle upon Tyne NE3 3DS. Tel: 091-213 1555.

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
POSTCODE \_\_\_\_\_

**SAGE**  
**MainLan**  
NOW YOU'RE REALLY TALKING BUSINESS

# CHECKOUT

and MainLan has that feel of being thoroughly designed rather than thrown together.

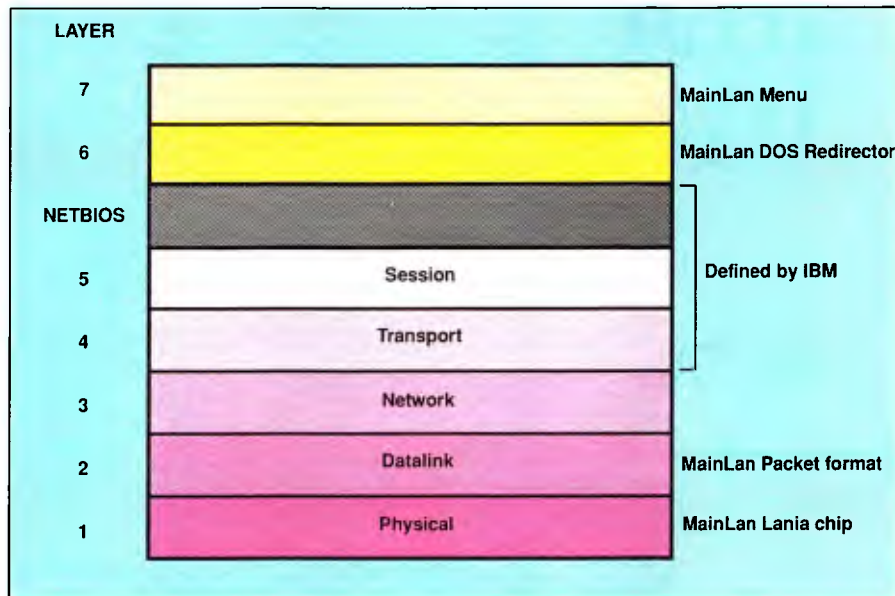
At the centre of the new hardware is a custom network chip called the Lancia or Network Interface Chip (NIC). It was designed by Alfa Systems and produced for that company in Italy. The chip contains virtually all the logic for the systems, the only other components being an 8k RAM chip and a couple of support chips to correct a bug in the first version of the Lancia.

The card is a half-length 8-bit PC-style card with two connectors mounted on the back-plane — data in and data out. The network is a bus configuration with the stations connected in a long chain with a terminator at each end station. The new cable used is a shielded twin-twisted pair cable, but the old Sagenet cables can be used over short distances. The actual distance between nodes is unimportant as long as the total network length remains less than 300 metres and no more than 63 machines are included. Although the distance problem can be overcome with network signal repeaters, very few users will find either limitation a problem.

The first and lowest layer of hardware is described as the physical layer (see alongside for the complete layer structure). The data is sent in such a way that every station can receive clocking information from it. To achieve this an F/2F encoding is used, where F is the frequency (see the following page). This guarantees a transition after every data bit with an additional transition for each data bit that is a 1. So, when the network is operating at 4Mbits per second there is a state transition every 250ns for each station to synchronise itself with.

But not only does each station need to know how the data is coded; it needs to know who the data is from. The network access protocol used is a variant on CSMA/CD (see the box in the August article for full details). It differs in that any station wishing to transmit, rather than simply bursting in, waits for a period of no transmission and then transmits its signature on to the network. If no one interrupts then the network belongs to that station until the next packet of data has been transmitted.

The Lancia chip also has a soft interrupt selector built into it. One of the biggest problems of installing an interrupt-driven card into a machine is deciding which hardware interrupts can be used. In the past it was up to the user to check all the boards in use and then select a free interrupt for the new card by moving a jumper. This also applies to the DMA channel that can be used and some-



*The seven-layer structure of a typical PC network*

times even to the hardware input/output port selected. Thankfully, the MainLan hardware and software simplify this process dramatically by interrogating the host machine and deciding what interrupts, channels and ports are available.

The second layer is the datalink layer which allows small packets of data to be transmitted. The actual format of the data packet was specially designed by Alfa and includes error-checking and detection for error-free data transfer. On top of this is the network layer.

The next layer of hardware up is the session and transport layer. This is where compatibility with previous networking systems is crucial if you want third-party networking software to run. The networking standard supported is the NetBIOS calls defined by IBM in PC LAN. This means that any networking software which uses that standard to communicate will work.

A further layer on top of the NetBIOS is the presentation layer. This network file server and redirector is compatible with MS-DOS 3.10 and above, and is what makes MainLan different from virtually all other low-cost networks. Any machine can offer any device to any other machine(s) to be used directly from DOS. For example, logical drive F: on my machine could be physical drive C: on your machine, but I could use it as though it was actually in my machine. I shall expand on this in the 'Software' section.

The final layer on top of this great stack of interfaces and protocols is the application layer. This is a simple menu-driven program that gives the user full

control of the network without having to understand any of the layers previously described . . . at which point the majority of readers heave a huge sigh of relief.

## Software

As I have mentioned, MainLan can be used on two different levels — the presentation and application layers. As you cannot use the presentation layer without first setting it up using the application layer, let's consider the latter first.

When you've installed the hardware — simply by slotting in the card and connecting the cables and terminators to the two remaining sockets — type NET-SETUP to load the software. The install program is well written, and allows you to decide which drives you want to use and whether you trust the setup program to change your AUTOEXEC and CONFIG files itself. When the installation is complete, type NET and the main menu will appear. I'll run through each of the features individually.

The files menu gives access to a directory listing of any disk on any machine on the network. You can then Get, Send, Erase or Rename files. I found this feature to be of very little use as once a drive on another machine is connected to your machine, you can use all the standard DOS functions exactly as you'd expect.

The Printer support allows full control of any printer on the network. If you possess a printer you can offer it as a network printer so anyone else can use it, or you can connect to someone else's printer as your standard output device.



VEGA  
VGA

\$540

INC. TAX

MICROSOFT  
FULL RANGE  
CALL FOR  
PRICES

FULL RANGE  
OF WYSE  
AND ULTRAS  
PC'S & AT'S  
CALL FOR A  
CONFIGURATION

## SOFTWARE

### SPREADSHEETS

|              |       |
|--------------|-------|
| Quattro      | \$285 |
| Lotus 1-2-3  | \$584 |
| Silk         | \$199 |
| Javelin Plus | \$749 |
| Supercalc 4  | \$630 |

### DATABASES

|                |       |
|----------------|-------|
| Dbase III Plus | \$795 |
| DBase IV Plus  | Call  |
| Paradox II     | \$899 |
| Fox Base       | Call  |
| Reflex         | \$199 |
| Clipper        | \$885 |

### WORD PROCESSORS

|                       |       |
|-----------------------|-------|
| Word Perfect V.5      | \$575 |
| Multimate Adv II      | \$689 |
| WordStar Prof. 4      | \$450 |
| WordStar 2000 + Rel 3 | \$495 |
| Microsoft Word        | Call  |

### GRAPHICS

|                  |       |
|------------------|-------|
| Freelance Plus   | \$669 |
| Harvard Graphics | Call  |
| Magician         | \$399 |
| GEM Draw         | Call  |
| Ventura          | Call  |

### UTILITIES

|                      |       |
|----------------------|-------|
| Norton Utilities     | \$120 |
| Norton Advanced      | \$189 |
| Norton Commander     | \$105 |
| Xtree Pro            | Call  |
| DS Backup Plus       | \$175 |
| TypeQuick            | \$84  |
| Fastback Plus        | \$299 |
| Sideways             | \$105 |
| PC Tools Deluxe      | \$115 |
| Complete PC Tutorial | Call  |

### COMMUNICATIONS

|            |       |
|------------|-------|
| Gateway V3 | \$149 |
| Crosstalk  | Call  |
| Mirror     | \$125 |

### INTEGRATED

|                |       |
|----------------|-------|
| Framework III  | Call  |
| Symphony       | \$945 |
| Open Access II | \$975 |

### BORLAND

|                           |       |
|---------------------------|-------|
| Sprint                    | Call  |
| Quattro                   | \$285 |
| Turbo Pascal V.4          | \$125 |
| Turbo ProLog              | \$125 |
| Turbo Basic               | \$125 |
| Turbo C                   | \$125 |
| Sidekick Plus             | \$280 |
| Pascal Toolboxes          | \$125 |
| Pascal Developers Library | \$425 |

## HARDWARE

### NETCOMM MODEMS

|                 |       |
|-----------------|-------|
| Smart 1200 SA   | \$518 |
| Smart 123 SA    | \$695 |
| Smart 1234 SA   | \$779 |
| In Modem 2400A  | \$474 |
| In Modem 123A   | \$445 |
| Aut modem 12/12 | \$395 |
| Aut modem 123   | \$475 |
| Aut modem 1234  | \$555 |
| Pocket Modem    | Call  |
| Others          | Call  |

### TAPE UNITS

|                          |      |
|--------------------------|------|
| Archive 40Mb Internal    | Call |
| Everex Excel Stream 60Mb | Call |
| Peridata Drives          | Call |

# ULTRA



# WYSE

# MICRO SALES

## PERSONAL COMPUTING FOR BUSINESS

### MONITORS

|                    |       |
|--------------------|-------|
| NEC Multisync II   | Call  |
| NEC Multisync Plus | Call  |
| ADI 12" Mono       | \$199 |
| ADI 14" Mono       | \$239 |
| ADI EGA            | \$799 |
| ADI VGA            | Call  |

### PRINTERS including cable

#### FULL RANGE:

EPSON  
FUJITSU  
STAR  
OKI  
NEC  
BROTHER

### DISK DRIVES

|                              |       |
|------------------------------|-------|
| Seagate 20Mb w/- Controller  | \$489 |
| Seagate 30Mb w/- Controller  | \$525 |
| Control Data 40Mb Voice Coil | \$950 |
| Control Data ESDI Drives     | Call  |
| Large Drives                 | Call  |

### LOTUS AGENDA NOW IN STOCK

### CARDS & CHIPS

|                         |        |
|-------------------------|--------|
| Hyperace 286 Plus 10MHz |        |
| PC/XT                   | \$689  |
| Intel Inboard 386 XT    | \$1540 |
| Intel 80287/8           | \$495  |
| Intel 80287/10          | \$629  |
| Paradise VGA Plus       | \$550  |
| Vega VGA                | \$499  |
| Vega VRAM               | Call   |
| Mono + CGA              | \$104  |
| Everex EGA              | \$349  |

- All prices include sales tax
- All products sourced from official Australian distributors
- Come with full warranty & support
- Call for any products not listed

Prices correct at time of printing,  
subject to change and stock  
availability

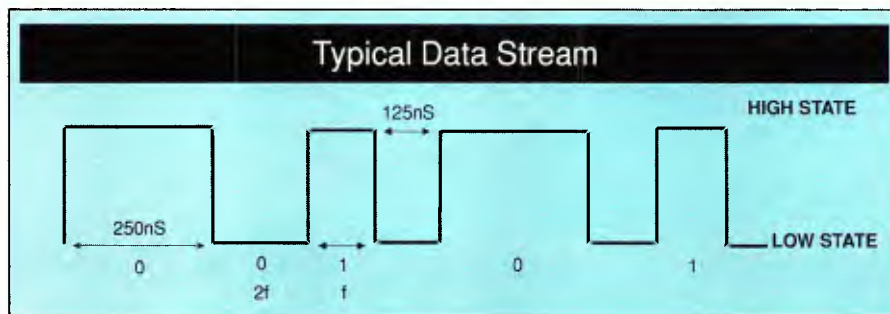
SEAGATE 20MB  
WITH CONTROLLER  
**\$489**  
INC. TAX

1ST FLR 579 HARRIS ST  
(CNR MACARTHUR ST)  
ULTIMO 2007

**(02) 281 3377**  
**FAX 281 3920**



## CHECKOUT



To enable the timing information to be transmitted a 1 is sent as a double state change, while a single character is used to represent a 0

By using the Divert function, any data that goes to the DOS PRN device will be directed onto the network printer. If someone else is using that printer, your job will be queued until it is contained within it. And you can print from this menu if you don't want your machine permanently connected to a network printer.

A printer that is connected both to your machine and a network printer can also be controlled. The local printer may be dominated by your networking friends, so this function gives you the power to stop them using it when you want to, or when the printer has jammed or needs servicing.

The next function is the Mail menu, which is probably the least useful item implemented. For the first couple of weeks you'll send lots of interesting long messages, but I'd say in most cases it is quicker to shout across the room. The only long-term use I can see for it is passing information to someone who is on the phone. For example, a secretary could send a message to her boss saying that someone was on the other line, explaining who it was and how urgent it was. The boss could then decide whether to get off the line or not. Even so, I don't think I'll use this feature again.

There is also a Utility feature that allows you to perform some simple network functions. You can see who else is on the network and what peripherals they are offering for sharing. You can also edit a file using the basic text editor included.

The most useful feature is the Disk Share menu — I would be willing to sacrifice all the other functions just to have this one. It allows any user to connect to any drive on any machine on the network and connect those physical drives as their own logical drives. This is where you begin to consider the network from a presentation level again. Simply offer all the drives you don't mind people using on to the network.

If you only want a couple of other users

to be able to access part of your data, you can use a password to protect any area of your disk. When you've connected the drives on other machines you want, save the setup and you need never know that you have a network running.

Now from DOS you can access other people's drives simply by typing the logical drive letter you assigned to their remote drive. This allows you to load a program from one machine, use the data from another and run the whole thing on a third, separate machine. The big advantage is that all the data files can be kept in one place where they can be backed up regularly. You then know that everyone is working with the most up-to-date version of every piece of data.

Even more impressive is the fact that the network now contains multiple non-dedicated servers; that is, anybody on the network can offer drives to anybody else. Such flexibility of use has been extremely hard to find in the past.

Unfortunately, simple as all this seems, there can be one or two problems. What happens if two people load the same document into a word processor, modify it and then save it back to the same file? Of course, the one who saves it second will overwrite the changes the other person made. The only way around this is to use networking versions of the software you are using, and this is where MainLan wins outright in comparison to Sagenet.

The only network software that Sagenet would work with was Sage's own proprietary accounts software; no other software would work directly. But Sage isn't about to make the same mistake twice.

MainLan, being NetBIOS-compatible, will run any NetBIOS network software without modification. As part of the development of MainLan, Sage has tested many major network-compatible software products. These include dBASE III Plus, DataEase, WordStar 2000 and Paradox. When using these packages

# WARNING

TO ALL **Tm** and **milac** DEALERS and PURCHASERS

BEWARE OF SEVERAL GREY MARKET SUPPLIERS. FOR YOUR PROTECTION AND VALIDITY OF THE  
GENUINE MANUFACTURERS WARRANTY, CALL KELLER AUTOMATION NOW  
TOLL FREE 008-331 715 FOR YOUR NEAREST AUTHORISED DEALER.

# Four Outstanding Reasons to Choose Paragon

Paragon 88 • Paragon 286S • Paragon 286 • Paragon 386



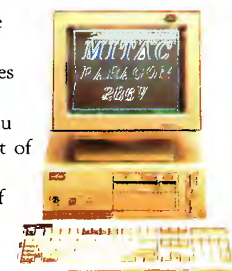
## PARAGON OUTSTANDING OFFICE SOLUTIONS

### Mitac Paragon 286V — Takes You Beyond the VGA Standard

When you need state-of-the-art performance and trouble-free compatibility with all the standards, old and new, Mitac's new Paragon 286V is your solution. Switchable 12/8 MHz CPU and optional internal 40 or 100 MB hard disks are just a few of the features you get integrated on this unique micro. With both 5-1/4" and 3-1/2" disk spaces on-board, you can bridge between the standards. And on-board enhanced VGA gives you 16-color, 800 by 600 resolution and support for all previous graphics standards. A host of other on-board "extras" insures you complete versatility.

Whether you use Desktop Publishing, Spreadsheets, LANs, or any of the thousands of other AT-based software packages, Mitac's Paragon 286V is your key to improved productivity.

For complete information contact your nearest Mitac office or authorized distributor.



**mitac**

*When reliability is a decisive factor*

**KELLER  
AUTOMATION**



### Exclusive Australian Distributors

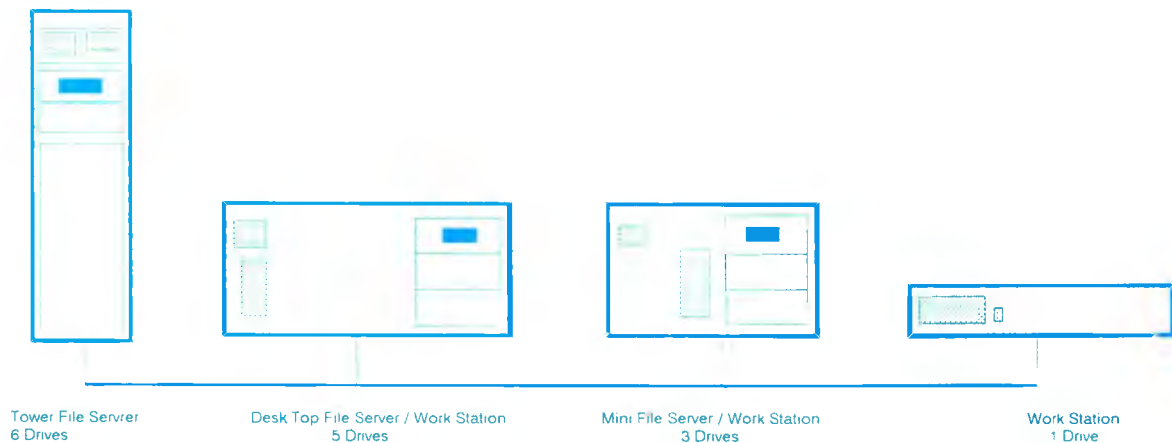
3 Walker Street, Braeside, Victoria 3195  
Telephone: (03) 580 1355 Fax: (03) 587 3373



# SANCOM COMPUTERS

## NETWORK CENTRE

SALES - DESIGN - SERVICE - INSTALLATION



### NOVELL NETWARE - 4 & 100 USERS NETWORKING SOFTWARE

Industrial standard high speed network operating system  
Peripheral sharing with print queing & spooling  
High security

MS & PC Dos compatible  
File & record locking ability  
Remote workstation

Electronic mail

### ETHERNET - High speed 10M bits/second network interface

Simple multidrop co-axial cable wiring  
Diskless boot Option

Up to 300 meters between nodes

### SANCOM FILE SERVER - 10MHz 0 wait state 80286 based computer

|                                            |                        |                                                  |
|--------------------------------------------|------------------------|--------------------------------------------------|
| Cache Memory                               | 1.2M Floppy Disk drive | Voice Coil Hard Disk                             |
| Battery backed real time clock             | Ethernet Adapter       | 1 parallel & 2 serial ports standard             |
| Non dedicated File server in 4 user system | -                      | File Server will also function as a work station |

### SANCOM WORK STATION

|                         |                                    |                                |
|-------------------------|------------------------------------|--------------------------------|
| 640K                    | Expansion memory                   | Local Floppy & Hard Disk Drive |
| Local Printer           | Ethernet Adapter                   | Diskless Boot capable          |
| <b>10MHz V20 CPU XT</b> | <b>10MHz 0 Wait State 80286 AT</b> | <b>20MHz 80386</b>             |

### ARCHIVE TAPE BACKUP UNIT

60M - 150M Internal or External units with controller

### SHOWROOMS & SALES OFFICES

Suite 1 10 Woodville Street  
Shop 146 313 Harris Street

**HURSTVILLE  
PYRMONT**

(Mon-Fri 9:30am to 5pm Sat 9:30am to 3pm)  
(Tue-Fri 9:30am to 5pm Sat 9:30am to 3pm)

Tel: **579 3377**  
Tel: **552 1640**

### SERVICE CENTRE & HEAD OFFICE

1 Athol Street Leichhardt N.S.W. 2040

Trade & dealer enquiries welcome

Tel: DEALER SALES 568 2500 SERVICE 568 2660 Fax: 569 0526

Specification subject to change without notice

## CHECKOUT

users can all work from the same data files, but any records they load are locked from modification by anyone else until the original user has finished. This stops files becoming updated simultaneously without having to resort to wholesale file locking, where only one user can access a file at any one time.

A further problem that has been solved is the perpetual PC problem of insufficient memory. Once you have Sagenet or the TOPS network from Sun Microsystems loaded you will probably have around 400k of memory left for your applications. If you want to run a memory-hungry application like Windows or Ventura, you will have to remove the network first. MainLan is designed in modular form so you can have as many or as few of its features loaded at any one time. If you install the full system it will gobble up around 200k of memory. But if you only have the server connection software loaded, you will have to relinquish a mere 50k. This means it is now feasible to run MainLan with virtually any other program.

Also, if you did still need to run the menu-based front end, you could run it in non-resident mode so it won't permanently take memory.

### Results of the transfer and printing tests

The tests were run on '286 and '386-based PCs. The printer used was a genuine Hewlett-Packard Laser Jet and as before it was connected to the '286 machine. It should be noted that in the original tests on Sagenet and TOPS, the printer used was the Kyocera HP-compatible, which prints a little faster. Therefore Tests 4 and 5 should be treated as a very approximate result if used for a direct comparison. The actual timings are in seconds.

**Test 1** A 239k file transferred from the 80386 machine to the 80286 machine.

**Test 2** The same 239k file transferred in the opposite direction. That is, from the 80286 machine to the 80386 machine.

**Test 3** Both machines attempting to transfer the same 239k file to each other. Separate sending and receiving directories were used to avoid filename clashes.

**Test 4** Printing out a four-page document on the laser printer through the printer serving machine, in this case the 80286 machine, while the server is idle.

**Test 5** The same printing test as in test 4, but with the 80286 machine continually accessing the hard disk. This was achieved using the following listing on a batch file called 'work.bat':

```
CHKDSK
WORK
```

|        | MainLan | Sagenet | TOPS  |
|--------|---------|---------|-------|
| Test 1 | 11.5    | 17.5    | 13.1  |
| Test 2 | 11.5    | 18.3    | 19.2  |
| Test 3 | 30.25   | 52.3    | 28.4  |
| Test 4 | 76.0    | 41.8    | 32.2  |
| Test 5 | 76.0    | 42.8    | 901.7 |

Save valuable time  
every day with  
the **RANDOM** information processor

# TORNADO



**PROBLEM:** With all the software tools available, it is amazing that an important need has been overlooked - a way to deal with the countless bits of *random* information you spend hours with every day. The kind of information that just won't go into databases or spreadsheets; the type scattered around your workplace and in your head. *Random* information that accounts for over half the information you have to deal with all the time.

**SOLUTION:** Tornado - the *random* information processor that not only saves you valuable time every day but makes you look like a genius with a photographic memory!

**"one of the niftiest programs I've ever seen"**

(BYTE, Jerry Pournelle)

**"Excellent Excellent Excellent Excellent"**

(PC World, Patrick Marshall)

**"a significant productivity tool"**

(PC Magazine, Chris Johnston)

**"simple ... superfast"**

(New York Times, Diment)

**"Excellent value"**

(InfoWorld, Review Board)

**\$195.00** R.R.P.

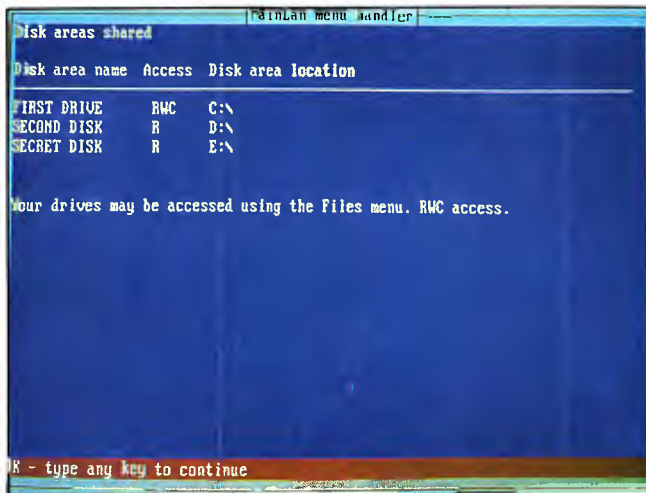
But don't just take the experts' word. Find out for yourself why corporate user surveys show that you may well use Tornado more than any other software package. Ring 'Solutions' now on:

Phone: (075) 395 422

Fax: (075) 393 482

P.O. Box 146 Ashmore City Qld 4214





Using the local command, the disks you are currently offering to the network are shown. RWC indicates that the drive may be read from and written to, while R protects the disk from being changed by making it read-only



The network is configured and maintained using the NET program. This is a menu-driven front end that allows a disk to be shared or connected, printing to be controlled and mail to be sent

## In use

Up and running, the network feels like a well written, professional package. Once you've set the network going you probably won't notice it's there except that you will have more disk drives than you had before. Even when a machine is busy with its own activity, when the drive is accessed from over the network there is no appreciable decrease in performance.

To try and quantify what was going on, I ran the same tests that we had devised for the low-cost networks review. Tests 1 and 2 show that the speed is dependent on the network transfer rather than the host machines. They also show that although the raw data speed of MainLan is four times faster than either Sagenet or TOPS, the difference is less than half in a real-world situation. This is because of the increased functionality that MainLan has over either of the others.

The third test shows that the network collision software has improved since Sagenet but it obviously doesn't match TOPS, as it produces a similar transfer rate at a quarter of the raw data rate.

The final two tests are a little misleading as the laser printer used was different. Accounting roughly for laser printer differences the time should have been about 10 seconds less than Sagenet in both tests. The fact that the transfer rate is equal whether the printer server is active or not is an important point if a large number of users share the same printer.

The printer diversion seemed to work well with all the packages tested and,

since it uses the DOS device PRN, I don't envisage problems with any of the major packages currently available.

One of the major failings of Sagenet was that when the hardware failed, it was impossible to know what had happened and everything had to be shipped back to the supplier for repair. Now Sage has included a diagnostics utility that checks what condition the network is in. It will be able to tell if any hardware on your board has failed, if there is an interrupt, port or DMA clash or simply a wire misconnected or disconnected.

Even during the testing this software was invaluable, just to make sure everything was wired correctly or to see if any of the prototype boards were playing up. Including this in the final package will remove a lot of the headache from network installation and maintenance.

## Documentation

At the time of writing the documentation was still being prepared. Sage has a reputation for producing well written and well presented manuals and there is no reason to suppose that this one will be any different. The software is very simple to use and those tricky hardware problems of DIP switches and the like have all been taken care of. This is one of those products whose manual you will briefly look at when you buy it, then put it on the shelf to gather dust.

## Conclusion

MainLan will be a success. Whether it

will be a huge success depends on two things. The first is that Sagenet suffered from a few bugs which were annoying and must have affected sales to some extent. This time Sage appears to have ironed out such problems *before* the product was released. And secondly, negotiations are under way with a number of other manufacturers about the licensing of the Lancia chip set. Sage says that these negotiations involve PC manufacturers putting the chips on the motherboard of a new range of PCs.

Whether this is solid fact or mere speculation remains to be seen, but if the rumour is true this could make MainLan the low-cost networking standard for many years to come. Sage's confidence is shown by the fact that it is already planning to launch a PS/2 MCA version of the Lancia board around Christmas this year.

All in all, this is an excellent product with a better than average chance for the future. For small and medium-sized business users it is a packaged solution to a perennial problem. It may even cause the corporate boys to look twice (although they do like buying those expensive high-powered dedicated file servers). Oh, by the way, if you really do feel lost not having a dedicated server, MainLan will let you do that as well if you really want to!

END

MainLan costs \$1499 for a two station network plus \$749 for each additional station, and is available from Personal Computer Software, tel: (02) 923 2899.

# THE ADVANTAGE



# ENHANCED

*Kaypro Corporation — electronics innovator since 1952 — has made a good thing even better. The KAYPRO 286i Model C now features a 40-MB hard drive and the 101-key AT-style keyboard. With the latest standard feature enhancements, the KAYPRO 286i is the smartest choice in advanced computer technology.*

#### *Advanced.*

*The heart of the KAYPRO 286i is the 80286 microprocessor — with a processing rate of 12MHz and 1MB of RAM. The perfect match for today's high productivity software.*

#### *And Enhanced.*

*The KAYPRO 286i Model C has*

*a 1.2-MB floppy disk drive, plus a hard disk with 40 MB of storage. The KAYPRO 286i AT-style keyboard features the new 101-key layout with separate cursor control, numeric keypad, and 12 programmable function keys.*

*Perhaps the nicest surprise about the KAYPRO 286i/C is the suggested retail price of \$4895  
\* Prices are subject to variation  
You won't find distinctive metal construction, 12MHz processing, and free name-brand software that includes WordStar Professional Release 4 in any other AT-type computer.*

*Other company's extras are Kaypro standard features.*



### *The KAYPRO 286i Model C features...*



*80286, 12-MHz Microprocessor.*



*An internal hard disk drive with 40 MB of storage.*



*Enhanced 101-key IBM PC/AT-style keyboard with security keylock.*



*640 KB of RAM; expandable to 15 MB.*



*Bundled software includes WordStar Professional Release 4.*

Trademarks: 286i, Kaypro Corporation; IBM, AT International Business Machines; WordStar Professional Release 4, MicroPro International.



*made in U.S.A.*

For the Kaypro Dealer near you,  
call (02) 542-3866 Fax (02) 521-6966

OVER 450,000 UNITS INSTALLED WORLD WIDE



# Everex has the Answer

Whatever you need for your PCs, XT<sup>SM</sup>, AT<sup>SM</sup> or compatibles, PS/2<sup>SM</sup> systems and Apple<sup>®</sup> Macintosh<sup>SM</sup> computers, Everex has the answer. Everex designs and manufactures products to enhance the power and capability of your system.



From modems to graphics adapters and tape backup, Everex makes more than 100 products—including our popular hard disks, tape backup and memory/multifunction boards. Everex can provide the right solution—at the right price. And Everex products support the newest technologies, from OS/2<sup>SM</sup> to EMS 4.0. We also have advanced 20 MHz/80386 and 12 MHz/80286 personal computers.



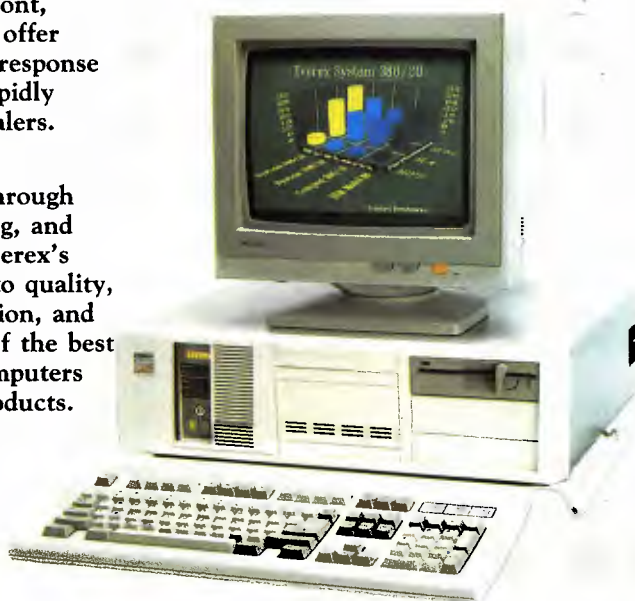
From our beginning in 1983, the people at Everex have provided quality products at affordable prices, with a commitment to personal service. Our honest, straight-forward approach has transformed Everex into a multi-hundred million dollar company employing over 1300 people worldwide.

With more than 175 engineers involved in research and development, we consistently develop the innovative PC products that you need. And because 100% of all Everex products undergo final assembly and test in our 250,000 square foot headquarters in Fremont, California, USA, we offer unparalleled quality, response and service to our rapidly growing family of dealers.

From initial design through manufacturing, testing, and after-sale support, Everex's complete dedication to quality, affordability, innovation, and service assures you of the best value in personal computers and enhancement products.



So, whatever your personal computing needs, *Everex has the answer.*



For more information or the name of your nearest Everex dealer please call:

**Tel: (02) 427-6111**  
**Fax: (02) 427-5948**

Everex is a trademark and EVER for EXcellence is a registered trademark of Everex Systems, Inc. PC, XT, PS/2 and OS/2 are trademarks and AT is a registered trademark of International Business Machines Corp. Apple is a registered trademark and Macintosh is a trademark licensed to Apple Computer Inc. © Copyright 1988 Everex Systems, Inc. All rights reserved.

**EVEREX**  
EVER for EXcellence<sup>®</sup>

Australia Everex Systems Pty Ltd  
Unit 6, 12A Mars Road, Lane Cove,  
NSW 2066 Australia



# Crystal

***If a so-called 'expert system' can work out rules for itself, does that lend some validity to its claim to be 'expert', and does it help to define the concept in the first place? Ruth Wallsgrove looks at Crystal version 3 and its Induction System to see how they approach the human touch.***

My colleague Owen Linderholm last year looked at Crystal version 2 and declared it was not a real expert system because it could not learn: 'Crystal has to be explicitly told all the rules it uses'. Now, Intelligent Environments has brought out the Crystal Induction System to be used with Crystal version 3 that will work out rules for itself. Does this make Crystal a tool for writing real expert systems?

The concept of 'expert system' is wonderfully vague. Many so-called expert systems make no attempt to try to act like a human expert: some mimic a human's conclusions, while others do things no human does. Few that we know of learn, and those that do least resemble a person. Given that little is known about how human beings of any skill level reason, it's a safe bet that no expert system yet developed or in the pipeline simulates human reasoning. What, then, is the point of an 'expert system'?

Perhaps the most useful definition is that of a program which does something useful and uncommon (as experts are useful and uncommon) but that isn't very exact. If we know *exactly* how something is done, it can be done with a conventional program. Algorithms do things exactly. But most of the things people do are messy, trial-and-error, empirical, using information (or 'knowledge') from a

wide range of sources; even if we can say how we do something, it is usually based on a trick that seemed to work last time, rather than on any universal law. Expert systems are based on the idea that if a procedure gives the right answer, use it. The classy word for this is a 'heuristic', and heuristics, along with knowledge, are the flavour of artificial intelligence in the 1980s.

Expert systems have their own family tree which goes back to MYCIN, a clever but little-used system to diagnose bacterial infection. Heuristics, and knowledge in general, could presumably be represented in a million ways, but MYCIN was written as rules; IF something THEN something else (with certainty factor so-and-so). It had a strategy for dealing with these rules — nothing basically complicated to understand (it worked backwards from a THEN through a chain of IFs that were some other rule's THEN until it reached the most basic IFs), but in this way the rules controlled where the program went in a way most data could only dream of. The appeal of MYCIN was that the program could explain where it had been, and where it was going, by translating into a sort of English the rules it had proved during its backward chaining. But it couldn't learn anything, and, even when translated, its rules

sounded quite unlike the most pnickety doctor.

## *Crystal clear*

Since its introduction in 1986, Crystal has been successful way beyond the expectations of its reviewers in *APC* and elsewhere. Crystal is not an expert system itself, but a shell — it aims to provide the structure and tools for you to build your own expert system. It may lack 'artificial intelligence' (whatever that is) and certainly has few of the impressive choices offered by more expensive expert system shells or 'environments', but it is recognisably second cousin to MYCIN — and it's easy to use. The punters like it, to be blunt.

Intelligent Environments claims that over 10,000 people are currently using applications written in Crystal, and that it's currently outselling rivals by 4:1. I wouldn't be surprised. It seems to have found favour in financial circles, and even in more interesting environments like engineering. Some companies report that they grow out of Crystal, but that doesn't necessarily prove that the marketing is more effective than the product: it would be more worrying if people abandoned expert systems development altogether after trying Crystal. And people who would write their



# SCREENTEST

| Crystal Induction |                      | Path C:\crystal | Problem | Problems on path 2 |
|-------------------|----------------------|-----------------|---------|--------------------|
| Problem           | Description          | Date            |         |                    |
| Expenses          | Expenses tutorial    | 23/09/88        |         |                    |
| Test              | My tutorial expenses | 22/03/88        |         |                    |

F1 for Help Screen, Esc for Main Menu

|         |            |          |        |      |
|---------|------------|----------|--------|------|
| Load    | Save       | New      | Delete | Path |
| Options | Attributes | Examples | Rules  | Quit |

| Crystal Induction |                   | Problem                            | Expenses | Rule size : 50 Lines |
|-------------------|-------------------|------------------------------------|----------|----------------------|
| accept            |                   |                                    |          |                      |
| 1                 | Outcome is accept |                                    |          |                      |
| 2                 | IF                | daily_rate is less than 650.0      |          |                      |
| 3                 | AND               | total_distance is less than 4000.0 |          |                      |
| 4                 | AND               | grade_of_staff is junior manager   |          |                      |
| 5                 | AND               | daily_rate is less than 350.0      |          |                      |
| 6                 |                   |                                    |          |                      |
| 7                 | OR                | daily_rate is less than 650.0      |          |                      |
| 8                 | AND               | total_distance is less than 4000.0 |          |                      |
| 9                 | AND               | grade_of_staff is junior manager   |          |                      |
| 10                | AND               | NOT daily_rate is less than 350.0  |          |                      |
| 11                | AND               | division is productn               |          |                      |
| 12                |                   |                                    |          |                      |
| 13                | OR                | daily_rate is less than 650.0      |          |                      |
| 14                | AND               | total_distance is less than 4000.0 |          |                      |
| 15                | AND               | grade_of_staff is junior manager   |          |                      |
| 16                | AND               | NOT daily_rate is less than 350.0  |          |                      |
| 17                | AND               | division is sales                  |          |                      |
| 18                |                   |                                    |          |                      |
| 19                | OR                | daily_rate is less than 650.0      |          |                      |
| 20                | AND               | total_distance is less than 4000.0 |          |                      |

F1 for Help Screen, Esc for Main Menu

|        |         |         |            |          |       |
|--------|---------|---------|------------|----------|-------|
| Induce | Display | Crystal | Attributes | Examples | Files |
|--------|---------|---------|------------|----------|-------|

The main menu in the new Crystal Induction program provides a list of all the files in the current directory. When a file is loaded, its attributes, examples and induced rules can be edited

When the attributes and rules are entered, a list of rules can be automatically produced. These can then be used as the foundation of your Crystal expert system

own programs anyway aren't really its target. Crystal raised a few eyebrows among the purists for having 'THEN something IF something else' rules, but given the way it reasons — backwards, like MYCIN — the rules make sense to most users. (And Prolog, of course, works the same way.)

Owen Linderholm was right to call it a simple programming language controlled by rules. That has its good points and its bad. In many ways, the logicians who've been trying to sell us 'production rules' for years are right: many relationships can be nicely expressed as IF-THEN rules.

There's no question that many users find Crystal much more approachable for encoding knowledge than Prolog or Fortran. On the other hand, some things are quite tricky to put in rules, or worse, seem easier than they are. Many of the rules in a working system will have to do all kinds of things that bear little resemblance to 'knowledge', and the knowledge itself may have all kinds of hidden levels that you don't notice at first when you say it in English. The desire sometimes to break out into Pascal can be very strong when using Crystal or any rule-based system.

Crystal also lacks some sophisticated programming functions: most serious for real expert system buffs is its lack of list-handling functions. Lists (as in Lisp or Prolog) make generating natural-sounding text not exactly easy, but at least no more painful than need be. Other shells written in Lisp or Prolog can take advantage of them.

A Crystal application can explain itself to a very limited degree. It can tell you

which rule it is currently trying to prove, and which it has already proved; the developer can add in other text, other screens or even external graphics files to help the user answer its questions. It doesn't do any translating, so if you don't write the rules in recognisable English the poor user won't be able to make sense of them. (However, it does helpfully remove system commands from the

*'There's no question that many users find Crystal much more approachable for encoding knowledge than Prolog or Fortran.'*

rules before it displays them.) Crystal also allows you to add in certainty factors, but the manual tries to discourage you from doing so. 'Many, if not most, applications do not require uncertainty' — especially since human experts hate being asked to put a number to their certainty.

Now the Crystal Induction System can write its own rules, which is something MYCIN didn't attempt. If you give it examples, it can work out a way to divide them and construct relationships between their 'attributes' and the desired 'outcomes'. An example is shown on the following page, adapted from the all-purpose AI example of 'Is Peter a Tiger?'. If you type the attributes in this order,

the Induction System will give you five rules: 'uncertain' outcome; 'unknown' outcome; one for a zebra (Outcome is Zebra if Food is Grass and Pattern is Striped); one for a lion (Meat and Plain); and one for a mammoth — but not the one you might expect and that would certainly differentiate it from all the other animals here. It will tell you 'Outcome is Mammoth if Food is Grass and Pattern is Plain'. . . it will not give a useful rule for any of the others because it has no grounds for distinguishing a tiger from a tabby cat, or a leopard from a dalmatian. These four animal outcomes will be listed in the 'uncertain' rule.

Other logically possible combinations of attributes (for instance, there's no animal whose Food is Grass and Pattern is Spotted in these examples) will be in the 'unknown' rule. (The manual claims that all other possibilities will be here, but it isn't true.) 'Claws' doesn't appear in any of the rules, which is reasonable, since it always appears with Meat and so doesn't give Crystal any useful information, even if you think it's interesting.

To get the system to notice that mammoths are extinct, you could put in another example that looks like a mammoth in other respects — a horse, perhaps. To allow it to tell a tiger from a tabby cat, you must add an attribute to distinguish between them — size, for example. Perhaps the most interesting thing about using it is how quickly you come to appreciate how much work goes into compiling a good set of examples, and how it's possible to distinguish things on features you think are quite unimportant. This can make for

# This box can hold over 18 million bits of information!

## IT COSTS QUITE A BIT LESS THAN YOU'D EXPECT!

Information and computer disk storage has never been approached so sensibly before! Before the revolutionary XIDEX FLEXIBLE DISK-KIT that is.

### DATA AND DISK STORAGE IN ONE!

It's such a simple idea, but it took Xidex to think of it. Instead of buying diskettes, throwing away the storage box, then buying a disk filing box — you can now buy your computer disks and storage box in one and you'll save heaps!

### INTRODUCTORY OFFER!

For a limited time only, you'll save nearly 50% off the recommended retail price! That makes the new XIDEX FLEXIBLE DISK-KIT the easiest business decision you'll ever have to make.



## LOOK WHAT'S INSIDE:

- 50 XIDEX DISKETTES  
Xidex 5.25" double sided/  
double density diskettes are  
world renowned for their high  
quality, extraordinary wear life  
statistics and ultra low disk drive  
head wear.
- DISKETTE STORAGE BOX  
Made from high impact-  
resistant plastic and featuring  
lockable transparent lid for  
safety and easy recognition.

With capacity for 50 x 5.25"  
diskettes. It comes with dividers  
for easy filing.

- BONUS TIMEWORKS  
SOFTWARE  
Data Manager PC Software —  
Everything you need for Filing  
and Record keeping. You can  
design your own customized  
data base and generate  
professional data reports.  
Includes Report Writer, Label  
Maker and Graphics!

**XIDEX®**  
**TIMEWORKS**

EXCEPTIONAL VALUE!  
**ONLY**

**\$149**  
**SAVE \$136**  
LIMITED TIME ONLY!

AVAILABLE THROUGH MAJOR DEPARTMENT STORES AND REPUTABLE COMPUTER DEALERS ACROSS AUSTRALIA.  
INCLUDING: MYERS, DICK SMITH, BLUE CHIP, CHANDLER STORES AND HARVEY NORMAN.

#### VICTORIA

Computer Office Supplies (429 8488), Dial-A-Ribbon, (560 3633) Ultraphase Computers (650 1321), Kohjinsha Sotec (534 0286), Roberts Office Supplies (836 1333), Radio Parts (329 7888), The Local Computer Shop (572 2544), High Technology (596 6211), Gordon Business Systems (543 5522), Westend Computers (350 5144)

#### NEW SOUTH WALES

Ribbons & Disks (427 0500), Dial-A-Ribbon (858 1633), Manly Stationery (938 2522), Computerscope (957 4690), Computer Medics (546 7399), M.C.C. (957 3700), Resourceware (633 9646), Compu-K ((066) 218180), Word Express (439 8966), Special Office Equip ((060) 21 4481), Micro Trend (597 1416), O.E.M. Supplies (281 5588), Shop 4 Computers ((042) 27 3527), Osborne Shop ((042) 29 1259)

#### QUEENSLAND

Pick & Pay Hypermarket, Kaye & Associates (Brisbane City), D.K. Electronics (Greenslopes), Computercraft (Margate), Considering Computers (Annerley), Geoff Davey C.M.S. (Nundah), United Computer (East Brisbane), Westend Computers (City)

RUST MEDIA PTY LIMITED (XIDEX WHOLESALE) 79 DICKSON AVENUE ARTARMON N.S.W. 2064. SYDNEY (02) 437 5777 MELBOURNE (03) 696 3600 BRISBANE (07) 394 8325  
A.C.T. Dataflex (062) 47 2322 S.A. Emcor (08) 371 1244 W.A. Graphic (09) 227 6777



# SCREENTEST

| Food  | Pattern | Extinct | Claws | Outcome   |
|-------|---------|---------|-------|-----------|
| Meat  | Striped | No      | Yes   | Tiger     |
| Grass | Striped | No      | No    | Zebra     |
| Meat  | Plain   | No      | Yes   | Lion      |
| Grass | Plain   | Yes     | No    | Mammoth   |
| Meat  | Spotted | No      | Yes   | Leopard   |
| Meat  | Striped | No      | Yes   | Tabby cat |
| Meat  | Spotted | No      | Yes   | Dalmatian |

greater efficiency in the number of features the system needs to consider. On the other hand, an expert system that doesn't share a human set of priorities may be bizarre to use and unpopular with its users.

The Induction System looks at the attributes in the order they're entered. (That's why it didn't notice that the mammoth is extinct. If you put this attribute first instead of third, it will use it and ignore the fact that it ate grass.) If you use a small set of examples, it doesn't always look very smart — or rather, sometimes it comes up with rules that are weird. But the algorithm used — 'Quinlan's ID3' as Intelligent Environments and MSc students call it — has a respectable vintage itself. The Interac-

tive Dichotomiser 3 sorts examples by using the variable that discriminates most first. The underlying algorithm was based on how people seem to learn about things (how to tell a tiger from a lion, for example). People, it is assumed, divide up things by the most 'relevant' feature (striped?) first.

The problem is only how to work out what is 'relevant' and this can be done in different ways. ID3 itself uses information theory — the idea of how much information you 'lose' by using a particular attribute to distinguish between the examples, where 'losing' information is a good thing. Intelligent Environments couldn't tell me much about how the Induction System uses the CLS plus ID3 method, because that company adapted

someone else's program, Attar's Xpert-Rule.

Intelligent Environments has the attitude that rule induction is useful for doing the straightforward but tedious work of transforming a good set of examples into Crystal rules, at best a check for 'hidden' (or more efficient) rules within the data. It is dubious that learning in any wider sense is very useful for most applications. A computer system can only learn if somebody tells it when it gets something right (or wrong). So, after it's been written and a long way from the expert, and is being used specifically to tell the user something they don't already know, how is it to learn? What the Crystal Induction System can do for you is help you formulate rules from a set of examples, where you — as the expert or colleague of an expert — do know which succeed and which do not.

One more thing on 'learning': it is fiendishly difficult to make a computer learn anything interesting. But for what it's worth, Crystal itself has the functionality to mimic various classic learning systems because, although it can't rewrite or add to its own rules, it can store new values for variables. If it changes a variable such that a rule that was true before

## SMART KEY

Voted Best Australian  
Software Product  
— Australian PC Society

No matter who you are, your software was written by somebody else. Somebody who didn't know you or what you want your computer to do. The result? Wasted time, commands that don't make sense, keys that don't work and endless repetition.

Let SmartKey take over those boring keying tasks. Having SmartKey work for you is like having a macro for all of your application programs, not just a selected few.

SmartKey is the original of its type and has been on the market for more than eight years. It is an Australian program which means that you get immediate availability, local support and updates as fast as they are developed.

**For IBM systems and clones.**  
**Price: \$81 plus \$6 p&p.**

## SIDE WRITER

Throw away the sticky tape. Sidewriter will print your spreadsheets, comparison charts or any other documents sideways — along the page rather than across it. With fan-fold paper, you can have the documents as wide as you like without staples, glue or other mess.

Sidewriter prints from text files or direct from Lotus worksheets with a choice of fonts. As well, it provides a resident program which gives you total control over your printer's features.

**For IBM systems and clones with an Epson compatible printer.**

**Price: \$99 plus \$6 p&p.**

**FBN**  
**Software**

AUSTRALIAN SYSTEMS SOFTWARE

(062) 85 2218 P.O. Box 19, Woden 2606

## KEEPING YOU IN THE PICTURE

If it's portable

### Epson PC Portable

This is the definitive laptop computer. Fully compatible, truly portable, highly legible, smaller than a briefcase. Best visibility in unfavourable lighting is obtained from the electro-luminescent back-lit version.

This laptop comes with dual floppy or one floppy and a 20Mb hard disk. It is the definitive answer for your portable needs. Market World Computers

definitive price from **\$3349**

For the home user or small business, the scene changes to

### Epson PCe

Full compatibility with the IBM PC/XT makes available the widest selection of popular software. Whether it's for word processing, a database package, or a sophisticated file management system, it will make your business run more efficiently. Options it has aplenty. Multi graphics adaptor, colour display or enhanced colour display plus external drives if required.

The PCe is designed with the user in mind and Market World Computers have the user in mind when they put a 20Mb mono unit on the market at a Christmas Special price of **\$2979** INCLUDING A FREE Epson LX800 printer.

### The Epson PC AX2

Smaller, faster, more flexible, more convenient and costing significantly less than the competition at Market World.

Fully menu driven on-line help function is also included at no extra cost, and six expansion slots ensure add-on/plugin boards are available to make sure compatibility is not limited.

With the fastest standard clock speed of 12MHz on board the PC AX2 can also be switched to 8MHz at the flick of a switch. Computers special price of

**\$3699**

(20Mb mono)

**\$4799**

(20Mb PGA)

When it comes to quality equipment from quality suppliers just turn to

## A World of Computer Solutions

# EPSON





# SCREENTEST

Crystal Induction Problem Expenses Examples : 30 Space : 1160

| 1        | 2     | 3     | 4         | 5        | 6           |
|----------|-------|-------|-----------|----------|-------------|
| totalist | mode  | grade | division  | dirgrate | Outcome     |
| 1        | 50    | air   | engineer  | productn | 100 accept  |
| 2        | 5000  | boat  | sen-mgr   | finance  | 200 reject  |
| 3        | 1500  | boat  | jun-mgr   | finance  | 100 accept  |
| 4        | 400   | rail  | jun-mgr   | finance  | 50 accept   |
| 5        | 100   | car   | consultnt | productn | 50 accept   |
| 6        | 100   | car   | consultnt | sales    | 1000 reject |
| 7        | 100   | car   | consultnt | sales    | 250 accept  |
| 8        | 20    | car   | director  | sales    | 50 accept   |
| 9        | 20    | car   | director  | sales    | 1000 reject |
| 10       | 20000 | air   | director  | sales    | 1000 accept |
| 11       | 1000  | boat  | sen-mgr   | finance  | 1000 reject |
| 12       | 1000  | boat  | sen-mgr   | finance  | 500 accept  |
| 13       | 2000  | air   | director  | finance  | 400 accept  |
| 14       | 1000  | car   | consultnt | productn | 400 reject  |
| 15       | 200   | car   | engineer  | productn | 120 reject  |
| 16       | 1500  | car   | sen-mgr   | sales    | 200 accept  |
| 17       | 1500  | rail  | engineer  | productn | 800 reject  |
| 18       | 1500  | rail  | engineer  | productn | 150 accept  |

F1 for Help Screen, Esc for Main Menu

|       |        |        |            |        |       |
|-------|--------|--------|------------|--------|-------|
| New   | Change | Delete | Mark       | Expand | Sort  |
| Print | Import | Export | Attributes | Rules  | Files |

The Induction System learns by example. This list of data can be imported from a database file

Crystal Induction Problem Expenses Attributes : 5 Outcomes : 2

| 1        | 2         | 3     | 4         | 5        | 6       | 7      |
|----------|-----------|-------|-----------|----------|---------|--------|
| totalist | mode      | grade | division  | dirgrate | Outcome |        |
| 1        | Numeric 0 | rail  | jun-mgr   | finance  |         | accept |
| 2        |           | boat  | sen-mgr   | productn |         | reject |
| 3        |           | air   | engineer  | sales    |         |        |
| 4        |           | car   | consultnt |          |         |        |
| 5        |           |       | director  |          |         |        |
| 6        |           |       |           |          |         |        |
| 7        |           |       |           |          |         |        |
| 8        |           |       |           |          |         |        |
| 9        |           |       |           |          |         |        |
| 10       |           |       |           |          |         |        |
| 11       |           |       |           |          |         |        |
| 12       |           |       |           |          |         |        |
| 13       |           |       |           |          |         |        |
| 14       |           |       |           |          |         |        |
| 15       |           |       |           |          |         |        |
| 16       |           |       |           |          |         |        |
| 17       |           |       |           |          |         |        |
| 18       |           |       |           |          |         |        |

total distance

F1 for Help Screen, Esc for Main Menu

|       |          |        |       |       |
|-------|----------|--------|-------|-------|
| New   | Change   | Delete | Value | Label |
| Print | Examples | Rules  | Files |       |

The attributes screen lists all the possible text entries for each of the variables

is no longer true, it will change the system's behaviour. I'm not suggesting Crystal would be an efficient way to implement most learning algorithms — just that the term 'learning' covers a multitude of sins.

## In use

The Crystal Induction System program is fairly straightforward to use. It can run from a 360k disk, although Crystal itself needs a hard disk or high-density floppies. It doesn't require any installation and even without the rather terse manual it's fairly easy to determine what key to hit if you share my 'when in doubt, hit ESC' superstition.

The basic layout is of an Attribute screen and an Example screen for any set of examples. The Attribute screen lists all the attribute names ('Food', 'Pattern'), all the values these currently have ('Meat' and 'Grass', or 'Striped' and 'Spotted') and all the outcomes ('Tiger' or 'Tabby cat'). The values and outcomes (but not the attribute names) can be entered directly or added from the examples you put in. If, when you're adding an example, you type an attribute value or an outcome that the system hasn't listed already, you are just asked to confirm that it should be added to the list. Otherwise, you can pick values or outcomes from the relevant list by placing the cursor in the right place in the example and using the up or down cursor keys to bring up each of the list in turn — a method I hadn't met before, but useful enough if you remember to hit Return before trying to move around the screen again.

Commands are listed along the bottom of the screen and chosen with their initial letter. To start a new set of examples you choose New and give the set a name and a brief description. The brief description is going to play a starring role later on, so it's wise to make it informative. You then have to define at least some attributes first, by going to the Attributes screen. Attributes have names of up to nine characters — like 'Food' — and, if they are text, values. Strangely, yes/no and true/false are treated just like text, but in any case the attribute is said to be of 'Logical' type. The other two possible types are Numeric and Date, which don't have values. You don't have to enter any values at this point, just names, but the big advantage of having defined values is that you can then choose from a list rather than typing them, possibly inconsistently, in the examples.

Note that the system does enforce the idea of individual examples. If you know that an outcome has a range for one of its attributes — the size of a tiger, for example, would be most usefully expressed as a numeric range — you will surely be tempted to tell the Induction System this, instead of entering a lot of examples that are identical except for their sizes. But you're not allowed to think like that. Only the Induction System itself will give ranges for Numeric Attributes when it writes rules.

Outcomes, which are listed on the same screen, have text values. As you may have noticed, the rules use the word ('Outcome is Tiger') and you can't change this in the Induction System to something more meaningful like

'Animal'. You are also limited to 32 outcomes. You don't need to pre-define these: in fact, defining outcomes that you then don't use in examples just adds empty rules, as does deleting an example without also specifically deleting its outcome.

When you have some attribute names, you can proceed to the Examples screen. This has the same structure as the Attributes screen — attribute names and the word Outcome as column headings along the top. The New and Change commands allow you to add and edit examples, one example per row.

When you have some examples, you can induce with Rules. You can look at these in turn with a rather cumbersome combination of keys, to get an idea if they are at all sensible. If not, you have to re-think your examples or their attributes or both. But when you are satisfied with them — or if you just want to see what Crystal does with them in practice — you write them to a 'rule listing' with the command Crystal. You must then quit the Induction System and go into Crystal itself, where you pick the Read rule listing option from the Files menu to make a new knowledge base with the rules.

Every rule listing and knowledge base is stored, by the Induction System and Crystal respectively, in files with the names you give them and .rl and .kb extensions. But all example sets are stored in one file, called (as far as I could see) PROBLIST. Anyway, if you lose track of that you can have endless amounts of fun trying to remember just where the Induction System did put your examples.

## KEEPING YOU IN THE PICTURE

A cast of dot matrix characters from the World's No. 1 printer company — EPSON!

### The LQ-500

This well known performer burst onto the scene featuring a 24 pin print head, automatic sheet loading, optional font cartridges and a selection of ESC/P software commands to create special print effects. It's also available at a special Market World Computers price (inc. cable) of

**\$695**

### The LQ-1050

A leading artist, well known for competent performance, features an innovation that is as simple as it is ingenious. Just pull the top-mounted release lever forward and you've engaged the built-in push tractor unit for continuous paper. Push it back, and you've engaged friction feed for single sheets. As innovative as Market World Computers price (inc. cable) at

**\$1379.**

### The DFX-5000

At 533 characters per second output and dual tractor feeds this is a real throughput star. One that gets the job done fast and with little hassle. The high speed draft mode output is 533 cps. You want convenience, the DFX-5000 has two paper feeds, switchable at the touch of a button. You want correspondence quality you can have it in NLQ mode whilst maintaining a still amazingly fast output. You want reliability, well it's made by Epson. You want price well now you need to go to Market World Computers for the best price at

**\$3499.**

### The LQ-2550

For the starring role, the LQ-2550 is top of the line. It boasts an astonishing array of advanced features, like a built-in slot that lets you keep current with any newly created character type. Supporting a seven colour print capability, thanks to an innovative multi-ribbon cartridge, plus output that is face down correct page sequence eliminating the need for time consuming collation, this Epson star has its price and at Market World Computers the best prices are under contract at

**\$2599**

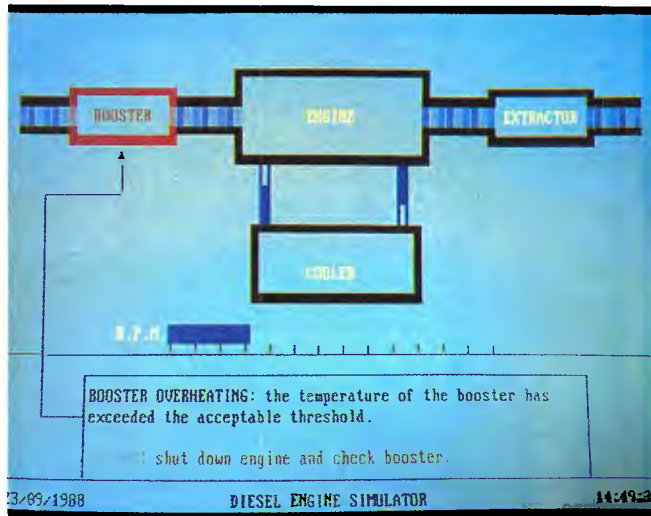
## A World of Computer Solutions

# EPSON®

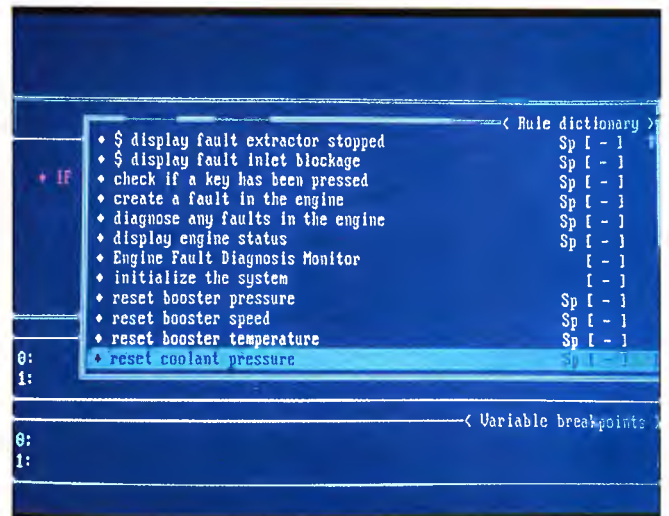




# SCREENTEST



A typical Crystal application is a car fault diagnosis package. A graphical representation of the car is shown. As parameters change, faults are experienced and remedies suggested



The list of rules and their attributes are stored in a dictionary. These can be edited as the system is running to provide a limited form of debugging

(Another nasty un-DOS-like trick is that anyone can set a password while they're in the Induction System, and then you not only can't get back into it without the password, but it won't let you back out either. I was not amused.)

The knowledge base can be run as it is and looks moderately sensible if you've chosen comprehensible names for attributes, attribute values and outcomes. The opening screen will be the description you gave for the example set, way

back in the Induction System. Crystal also automatically sets up a question and menu for each attribute value that it requires. However, this may be far from the expert system you want, even if the rules do give the right answers. It's been

## Sujon Computer Services

**HARDWARE**

**SPECIALS**

**12 MONTHS WARRANTY**

### ULTRA PC XT Turbo (4.77/10Mhz) From Imagineering

With 640Kb Ram, Dual 360Kb Floppies, Serial, Parallel & Games Ports, Clock & MS-DOS 3.3

With ADI Mono Monitor **\$1810**

With ADI Colour Monitor **\$2260**

With ADI EGA Monitor **\$2570**

Add \$380 For 20Mb Hard Disk, Single Floppy

Add \$400 For 30Mb Hard Disk, Single Floppy

### ULTRA PC AT Turbo (10Mhz/6.77) From Imagineering

With 1Mb RAM, 20Mb Hard Disk, 1.2Mb Floppy, Serial/Parallel, MS- DOS 3.3

With ADI Mono Monitor **\$3010**

With ADI Colour Monitor **\$3460**

With ADI EGA Monitor **\$3770**

Add \$140 for 30Mb Hard Disk - Add \$190 for 40Mb Hard Disk

All Prices Include Sales Tax, Delivery Extra.

905 Toorak Road, Camberwell Vic 3124

Phone (03) 299 2100 Fax (03) 29 1307

# KEEPING YOU IN THE PICTURE

IBM®, Olivetti® and Compaq™, would rather you didn't look at these real picture book prices for ULTRA from Imagineering.

## The Ultra AT

The perfect Australian PC giving you 100% compatibility, high performance, 12 months warranty and the best support available.

This machine from Imagineering means access to Australia's largest range of peripherals and software. It's reliable and the product is proven.

**Features include** \*10MHz (zero-wait) 6MHz System clock \*1 Mb RAM \*Small footprint style fancy chassis \*20Mb Hard Disk \*MS DOS/GW Basic \*Enhanced Graphics Adaptor and many more.

The fairy tale ending in price at Market World Computers is

**\$3195**

(20Mb mono)

**\$3899**

(20Mb EGA).

## An Imagineering CHRISTMAS SPECIAL

Market World and Imagineering are providing an early bird special for the ULTRA XT. Features 2 x 360K floppy drives and 640K of RAM. First Choice of software, FREE game and choice of mono or colour monitor for

**\$1595**

Mono

**\$1895**

Colour

available now from

**Sydney** 204-220 Sussex Street, Sydney.  
Tel: (02) 261 4411 Fax: (02) 264 1718

**Melbourne** 161 Park Street, South Melbourne Vic. 3205.  
Tel: (03) 699 2000 Fax: (03) 690 5810

**Brisbane** Tel: (07) 368 2385 Fax: (07) 369 0457

All prices are subject to change without notice.

A World of  
Computer Solutions

**IMAGINEERING™**



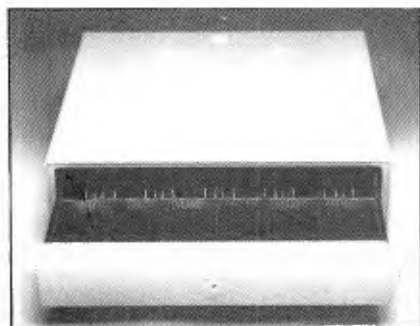
IBM® is the Registered Trade Mark of International Business Machines.  
Olivetti® is the Registered Trade Mark of Olivetti.



# Point of Sale Hardware



**POZ Customer Display**



**Computer Cash Drawer**

Also available : POS Printers, specialised bar code label printers, POS Controllers, Mag Card and Bar Code Readers, etc.

## EPSON PC's and Printers.



**UNIQUE  
MICRO  
DESIGN**

**Unique Micro Design  
Pty Ltd  
Unit 2/23 Wadhurst Drive  
BORONIA, VIC, 3155**

**Tel: (03) 887 1022  
Fax: (03) 887 0734**

**OEM/developer/dealer  
enquiries welcome.**

POZ-5 10/88

## SCREENTEST

estimated that half of any decent expert system should be devoted to communicating with the user, and in practice you would have to add a lot of screens and menus to make it pleasant to use, even if it contained enough knowledge (which it probably won't).

Crucially, the kind of attributes that an expert sees in an example may not be understood by a non-expert user. Take the example of a system to bid at bridge. An expert would assess a hand by expert categories like 'points' and 'guard'; but what if the user didn't know how to determine what the points were, or what 'guard' meant? (If you aren't an expert at bridge yourself — and I'm not — I hope this just makes this example more telling.) The system would then have to ask them to input something they do know, such as their cards, and calculate points and guard itself. If it was really friendly, it might also show the user how to do it.

In other words, an expert system, just like an expert, must convert what the user knows into the categories it needs to make a decision. The rules from the Induction System just give the top layers of the rule tree: the Crystal 'master rule'; a rule with a lot of 'Outcome is . . .' conditions separated by OR; a rule for each of those outcomes and a rule for each attribute in those outcome rules. This last rule will always be an 'ask' rule, to ask the user the value of the attribute. But you will almost certainly have to replace some of these ask rules with further layers that ask for other input, and do calculations or other manipulations with them.

Since the Induction System stores its rules in a Crystal rule listing, and Crystal can read these into an existing knowledge base, you could add new rules generated from new examples. But it's not a sensible idea. Adding new examples changes what rules are needed, as you will find if you ask to look at the rules inside the Induction System after changing examples. You have to tell it to induce again for it to notice your changes, at which point it throws away all the old rules. Really, inducing rules has to be the very first step in writing Crystal rules, and after that you'd be better off using the 'uncertain' and 'unknown' rules as a basis to include new examples if you can, or writing them manually if you can't.

### New Crystal

There are changes from Crystal version 2 to version 3.2. It's easier to produce the text and screens you want. This matters, since how an expert system looks

and feels is crucial — more crucial than for any other kind of computer software, I suspect, since it has to reassure the end user that it knows what it's doing. Crystal can now manipulate dBASE files as well as read them, something that might make it more suitable for use as a smart front end to databases, as Owen Linderholm predicted it would be used. Around here, people are just as interested in using database files as stupid back ends to expert systems, so the ability to create databases within Crystal itself could be very helpful. The knowledge base can now be far larger than is sane, if you have extended memory, and there's an OS/2 version which can handle them up to 30Mbytes.

Believe it or not, Crystal is at the cheap end of the market: Crystal version 3.2 costs \$3270, and the Induction System, which is sold separately is around \$1440. There are few things that someone, somewhere hasn't forced Crystal to do, but its appeal is probably that it doesn't offer too many artificial intelligence goodies. Controls over inference strategy and sophisticated data formats often aren't useful enough to be worth the effort to make them do simple things. Crystal doesn't allow anything other than a tree structure for its rules, but trees are easy enough to picture, whereas anything that allows rules to link up all over the place can be very hard to sort out.

### Conclusion

The Induction System is the icing on Crystal's cake. It doesn't do your thinking for you: you already have to know what the important attributes are in a decision and, once you know that, writing the rules to cover them is easy. What's more, the Induction System is only going to save you time if examples come naturally to hand — and not all experts think in examples. However, it can save you the slog of converting examples into rules. It wouldn't be the reason to buy Crystal rather than another expert system shell, but lots of people have found that Crystal is just the job for them because it doesn't ask any hard questions at first and gets you into a working system before you realise. Given a nice set of examples, the Induction System could get you started on a real system even faster. I expect it will have a long and happy life.

END

*The Induction System is scheduled for imminent Australian release and will cost around \$1440. It will be available from Oxford Systematics, tel: (03) 459 9671.*

## KEEPING YOU IN THE PICTURE

Simply the World's best computers from the advanced technology specialist.

### AST Premium Workstation/286

A new generation, 10MHz, AT compatible computer for users requiring full-featured capability in a compact system. The basic system includes 512K of RAM, two serial ports, parallel port, support for an 80286 co-processor, two full-length 8/16-bit expansion slots and a removable video adaptor module.

The machine for your network at

**\$2999**

### AST Premium/286

This unit features 20Mb, 40Mb or 70Mb fast access fixed disk drives plus multimode enhanced graphics adaptor. This zero-wait-state memory computer with a 10MHz 80286 processor is an AT compatible that outshines most of its rivals.

Test drive at Market World Computers and see the difference.

### The AST Premium/386

For a computer that offers minicomputer performance you cannot go past this one. It is the first 20MHz 80386 based computer offering minicomputer performance without abandoning existing hardware compatibility.

Completely AT compatible, incredibly fast and ready for the next generation of PC software.

All together the system includes on 32-bit memory slot, six AT or XT compatible expansion slots, a floppy disk drive, a high performance fixed disk subsystem with up to 150Mb memory, two serial ports, a parallel port, 80286 and 80386 co-processor support, a 101 key keyboard, MS-DOS operating system software, and optional graphic support.

An amazing quality package at the amazing price of

**\$7999**

**Sydney** 204-220 Sussex Street, Sydney.  
Tel: (02) 261 4411 Fax: (02) 264 1718

**Melbourne** 161 Park Street, South Melbourne Vic. 3205.  
Tel: (03) 699 2000 Fax: (03) 690 5810

**Brisbane** Tel: (07) 368 2385 Fax: (07) 369 0457

All prices are subject to change without notice.

## A World of Computer Solutions

### IMAGINEERING™







# ComputerEyes

*ComputerEyes is an inexpensive way to capture real-world images from any standard video source. John Rankin reviews this video acquisition system.*

At \$525, ComputerEyes is an attractive low-cost video acquisition system for the IBM PC/XT/AT compatible range of computers. Traditional frame grabbers for similar resolution and pixel depth cost over \$3000. ComputerEyes comes neatly packaged in a foam-lined box 15 by 25 by 5.5cm. Inside this box is a PC card with three connection cables attached to it, a PC disk and the ComputerEyes manual. The manual is 48 pages of clear laser-like printing, springbound between light cardboard covers.

## Installation

Installation was very easy. The manual lists the sequence of procedures in full detail, such as powering down your PC and removing its cover — a total of 10 steps in all. The steps include a description of what to do with the three cables connected to the card.

These cables are labelled 'V' for video, 'M' for monitor and 'C' for composite video output. The video card works on the composite video (not the RF) signal and all three connections are RCA adaptors — two plugs and one socket.

Having installed the hardware and screwed back the cover on an Earth AT computer, the floppy disk supplied was inserted and its contents copied to the AT hard disk. The distribution disk has no form of copy protection, which therefore allows you to copy its contents onto whatever disk you wish. It is a standard



*The interface board plugs into a standard video source and, in conjunction with the image-capture software, scans the input signal and digitises the acquired images into the computer's memory*

IBM 360k format floppy disk and according to the manual 'is quite full, as it contains example images that were captured with ComputerEyes'. This statement was, however, somewhat in error since the disk I received had only two

files on it, EYES.EXE and BOYS.RAW occupying a total of 220k.

EYES is the program that enables the use of the card and BOYS.RAW is a captured image in the raw image data format. (The deficiency in files is rapidly

## KEEPING YOU IN THE PICTURE

... for all your output needs, whether it's a compact or twice as effective need, Canon can picture the solution for you at Market World Computers. For instance ...

### Canon Bubble-Jet Printer

A leader in quality for a quieter and better working environment. This printer has everything a personal computer user could ask for; speed (220cps in HS mode, 110cps in HQ mode), crisp printout quality and the ability to print on virtually any plain paper.

When printing the BJ-130 at full speed hums along at a mere 45 decibels, ensuring a quite place to work. Available from Market World Computers at the peaceful price of **\$1799.**

### The Canon LBP-8II Laser Beam Printer.

This functional and sophisticated printer is far more compact and affordable than ever before at **\$3595.**

It can be connected to a mainframe or your own personal PC ... it's compatible and portable, and print output is second to none on all kinds of plain paper.

Virtually maintenance free; the photo conductor, toner, corona and cleaning station are contained in a single sealed and disposable cartridge. Great for graphics and compatible with all types of software systems, it's simply great value.

But if twice as effective laser printing is required try the ...

### Canon LBP-8IIT Laser Beam Printer.

Containing all the features of the 8II, this printer incorporates a double cassette paper supply system and is remarkably cost efficient at Market World Computers at **\$4399**

The double cassette system means you can change paper sizes at the touch of a button — A4, letter, legal and executive size cassettes are available, whilst manual feed is still possible.

OR if you wish to step up your flexibility even further, have a look at the ...

### Canon LBP-8IIR Laser Beam Printer.

Containing all features of the other two LBP's it has a breakthrough feature — Double sided printing — for professional word processing output. This means a better finish, cutting down on paper costs and filing space. Call us for a remarkable price.

## A World of Computer Solutions

# Canon





# CHECKOUT

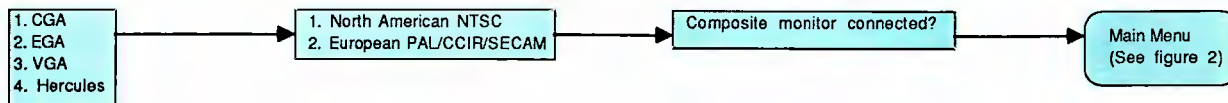


Fig 1 Menu map for the initial run of EYES.EXE

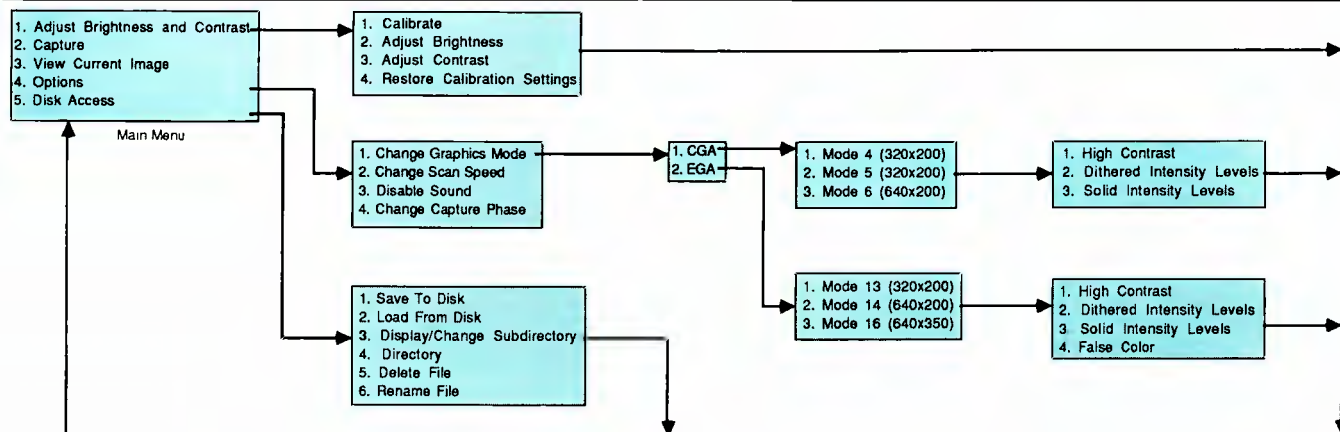


Fig 2 Menu map of the EYES program

corrected when all the equipment is put to use.)

As the raw image data format requires 128k for each file, there is only room for two such images per 360k floppy disk anyway. The EYES program also

provides more compact image file formats which will be discussed below.

## User interface

The package received was marked 'Ver-

sion 2.1' and on contacting the suppliers, Replex, the current version 2.2 of the EYES software was sent. The latter version supplies an extra main menu option 'View Video Input' which makes the monitor on the 'M' cable useful. (When

# ATTENTION P.C DEALERS

## DID YOU KNOW THAT ALGAR BURNS SOFTWARE ARE THE AUTHORISED AUSTRALIAN DISTRIBUTORS FOR THE FOLLOWING?

### DBXL DIAMOND RELEASE

The dBase III Plus™ Superclone that gives you dBase power plus added features such as graphics, windowing and many more. dBase also includes an easy to use menu and onscreen manual. All this and 100 percent compatibility for under half the price of dBase!™

### QUICKSILVER DIAMOND RELEASE

The professional dBase™ compiler which also supports the DBXL extended language. Quicksilver is more compatible than Clipper, creates compact EXE files, full record, file locking and many other features.

### DBXL NETWORKER PLUS

A memory resident utility for local area networks. Provides network capability for Quicksilver applications. Networker Plus also offers exciting LAN enhancements to every network user.

### DBXL/LAN

State of the art database management for your local area network. Use dBase™ or DBXL/LAN compiled programs on the same network, with the same data simultaneously with complete concurrency control and data locking. Choose dBase/LAN, the most advanced network database.

### GRAPH-IN-THE-BOX

Instant graphs in virtually any application – memory resident with eleven different graph types. Powerful and easy to use.

### DISK TECHNICIAN

Preventative maintenance software that repairs hard disks by predicting and correcting failures before and after they happen without removing programs and data.

### DIRECT ACCESS

Organises your software programs into a user-defined menu system. Protects against unauthorised access with passwords. Non-memory resident, it is as easy as a single keystroke to execute any program or command.

### BOOKMARK

Memory resident utility that automatically and periodically takes snapshot of system and video ram then saves it to a reserved and hidden area of the hard disk sub system. Work in progress can be resumed within four to eight seconds after reboot.

### PRINT Q

The first real main frame type print spooler available for IBM PC™ and compatibles. Runs the printer independently from your application – captures data bound for your printer and stores it on disk. Prints up to 255 copies automatically.

**ALGAR BURNS' price list currently shows more than 1000 software products, including Macintosh software. On request, other products can be sourced.**



**ALGAR BURNS**

**SYDNEY:**

TEL: (02) 321 389  
FAX: (02) 325 831

**PERTH:**

TEL: (09) 367 8277  
FAX: (09) 474 1614

# KEEPING YOU IN THE PICTURE

## The Compact with Impact The Canon A-200EXII

A compact new A-200EXII personal computer from Canon is an amazing little giant. Fully IBM/AT compatible, this power house allows you to tackle any personal computing task and still have room on your desk to spare.

It includes an 80286 16-bit CPU driven at high-speed clock 12MHz, 1.2 M-Byte floppy disk drive, 20 or 40 M-byte hard disk drive, and 1 M-byte on-board memory. Available from Market World Computers at the special price of

**\$3999**

(20Mb Mono)

**\$4883**

(20Mb EGA).

## The Canon Image Scanner IX-12F

A compact, high speed flat-bed image input device. This small desktop unit inputs images including text, graph drawings, maps and pictures from sheets or a book, directly into the A-200 EXII.

An optional document feeder allows you to scan sheets continuously, at 300 dots per inch, and 32 gray shades reproduce photographs faithfully, at 16 seconds per A4 page (faster if you want 150 dpi). A bargain at Market World Computers at only **\$3380.** (includes scanner interface & Dr. Halo software)

## Super Expression Bundle.

This includes the Canon A-200EXII compact IBM AT compatible 16 bit personal computer with 12MHz clock, the Canon IX-12 or IX-12F image scanner, and the Canon LBP-200V laser beam printer.

This is a fully integrated cast of characters. Just call for a very special Market World Computers price.

## A World of Computer Solutions

**Canon**





this option is selected the monitor echoes the input video signal, but otherwise the monitor remains blank!) Version 2.2 also allows EYES to run on slower PC compatibles.

The user interface is very easy to get along with. The screen is divided into a number of sections for header, status and other output information, with one section for menu selection.

The interface is not in colour, but is fully menu-driven. When the program is run for the first time, it asks for information about the nature of your graphics card (CGA, EGA, VGA or Hercules), the nature of the input video signal format (NTSC or PAL) and whether the monitor cable marked 'M' is connected to a composite video display monitor or not. This information is then saved in a file called EYES.CFG so that these questions need not be asked in future executions of the EYES program.

The menu map on the initial run of the program is illustrated in Fig 1. The menu map of the EYES program for subsequent runs is summarised in Fig 2. These maps show the extensive functionality provided in the EYES program — still images are captured from video input, saved to disk in a range of formats, or displayed in a variety of ways such as with variations of brightness and contrast settings, screen modes or dithering (both of the latter affecting the resolution of the displayed image). The EYES program has online user help: pressing function key F1 at any menu item displays up to three lines of descriptive information. Pressing the ESC key in any menu takes you one level back, and ESC in the main menu allows you to exit from the program.

## In use

In the tests, the ComputerEyes board was installed in an Earth Computer AT with a home colour video camera and VCR attached. Running the EYES program enabled the supplied raw images to be displayed in the various formats available in the program. However, the capture function would not at first work. The error message was 'No Video Signal Detected' and yet by disconnecting the 'V' and 'M' cables and connecting the 'video out' that was connected to 'V' into the 'monitor in' that was connected to 'M', the video signal could immediately be seen on the monitor. This problem was finally resolved when we opened up the AT again, and



*ComputerEyes captures real-world images through video digitisers*

realised that the default port address supplied with the ComputerEyes card, hexadecimal 220, was in the range of addresses used by another peripheral on the AT. Hex 21C to 240 were used as an I/O buffer to a Mercury Zip array processor supplied by ICI Australia.

The ComputerEyes board is equipped with a row of eight DIP switches for changing the port address that it uses. The supplied manual has a table of addresses versus DIP switch settings. So we simply selected a free address, in this case hexadecimal 320, and rebooted the AT. A nice feature of the EYES software is that it autodetects the address of the ComputerEyes communications port. This time, on running the EYES program there was no problem, and images were successfully captured.

The manual also explains how to ad-

just the width and height of an image by setting pots on the card. I found it necessary to adjust the image width for PAL to avoid duplicating the right-hand column of the image. The calibrate option never worked, always returning the incongruous message 'No Video Signal Detected'. It is supposed to automatically adjust brightness and contrast levels to their optimal values for the image. The adjustments therefore had to be made manually on a trial and error basis.

This kind of equipment quickly raises the interest of anyone passing by — everyone wants to see their picture on the AT graphics screen or take it home on a floppy disk! The equipment takes 12 seconds to grab a 640 by 200 pixel image (during which time the subject should remain perfectly still, or use a still-frame facility on a VCR). The EYES

program has a fast capture mode which takes only six seconds, but the resolution is effectively only 320 by 200. The image is captured with 64 grey scale shades per pixel. This is barely adequate for research level activity in image processing where these days 8-bit pixels are needed. However, this amount of frame memory is sufficient for the CGA, EGA or Hercules graphics cards.

The equipment could be used to produce colour images in 640 by 200 resolution with 256 thousand possible colours per pixel by capturing three versions of a picture — one using a red filter, one a green filter and the third with a blue filter. Such an image would be suitable for display on advanced (and expensive) graphics workstations.

## Conclusion

The EYES program allows raw image data to be converted to a number of more compact formats used by other programs such as BSAVE/BLOAD for Basic programs; TIFF, a format often used by desktop publishing programs; Microsoft Paint format; PC Paintbrush format; and GEM Paint format. It should be noted that no technical information is provided on direct access to the video frame RAM of ComputerEyes. However, this is not really needed in view of the functionality and ease of use of the EYES program. The ComputerEyes package is a most useful tool for adding realistic pictures to a wide variety of programs using a variety of graphics cards.

## At a glance

### ComputerEyes

**Supplier:** Replex

**Tel:** (03) 670 0687

**Price:** \$525

**Requires:** IBM PC/XT/AT or compatible, CGA, EGA or Hercules graphics cards, composite video signal source (eg, VCR or video camera output).

**In Short:** A very low-cost frame grabber with a powerful user-friendly control program, well documented and easy to use.

END



## Grow your PC memory to its full capacity with an award winning Hyperam memory board.

Here's how to increase your PC's memory instantly with a Hyperam memory board

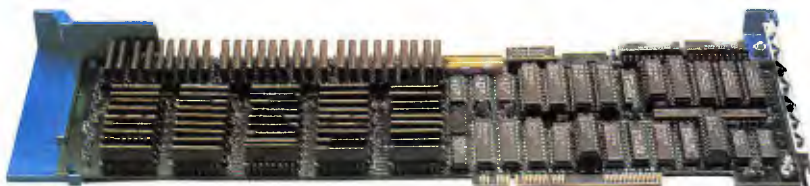
Hyperam boards provide extra memory capacity from 512Kb to 8Mb for your IBM PC, XT, AT, PS/2 or compatible.

The table clearly demonstrates there's a Hyperam board for every need — for increasing system memory to 640Kb limit, for expanded memory applications including Lotus 1-2-3™ and Symphony™ for Xenix™ and OS/2™ extended memory applications, or for all of the above!

And every board comes with RAM disk and print spooling utilities plus easy-to-follow installation package and manual.

**Hyperam memory boards win awards.** Officially endorsed by the people who count — our users — the Hyperam range sets the highest standards for quality, performance and value. Plus a bonus — Australian design and full support right here on your doorstep. This winning combination should be a part of **your** growth plans.

| Model             | PC Type                           | Memory sizes | Memory configurations                | Ports etc                                                    |
|-------------------|-----------------------------------|--------------|--------------------------------------|--------------------------------------------------------------|
| Hyperam           | IBM PCs, XTs and compatibles      | 512Kb-2Mb    | System<br>Expanded (LIM)             | N/A                                                          |
| Hyperam/MF        | IBM PCs, XTs and compatibles      | 512Kb-2Mb    | System<br>Expanded (LIM)             | 1 parallel 1 serial<br>clock/calendar<br>2nd serial optional |
| Hyperam 30        | IBM PS/2<br>Model 30              | 512Kb-2Mb    | Expanded (LIM)                       | N/A                                                          |
| Hyperam 30/MF     | IBM PS/2<br>Model 30              | 512Kb-2Mb    | Expanded (LIM)                       | 1 parallel<br>1 serial                                       |
| Hyperam AT        | IBM ATs and<br>compatibles        | 512Kb-2Mb    | System<br>Expanded (LIM)<br>Extended | N/A                                                          |
| Hyperam AT/MF     | IBM ATs and<br>compatibles        | 512Kb-2Mb    | System<br>Expanded (LIM)<br>Extended | 1 parallel 1 serial<br>2nd serial optional                   |
| Hyperam 50/60 2Mb | IBM PS/2 Models<br>50, 60 and 50z | 512Kb-2Mb    | Expanded (LIM)<br>Extended           | N/A                                                          |
| Hyperam 50/60 8Mb | IBM PS/2 Models<br>50, 60 and 50z | 2Mb-8Mb      | Expanded (LIM)<br>Extended           | N/A                                                          |



Phone us now for more information  
Phone: (02) 816 1211 Fax: (02) 816 3960  
408 Victoria Road, Gladesville NSW 2111.

**HYPERTEC**





# Printer performance

***Better performance, sleek designs and improved graphics capabilities are making it more exciting, yet more difficult, to find a printer to suit your needs. Here, APC's review team check out five laser and four dot-matrix printers.***

## Laser printers

In 1984, the Hewlett-Packard LaserJet was the printer that broke the dam and opened desktop computing to the superb quality and silent operation of laser printing.

Daisy wheel printers still ruled the letter-quality-printing roost. But the handwriting was clearly on the wall, and since that time laser printers have taken that market over and eroded the market for pen plotters as well. Lasers aren't number one, but they have arrived solidly in the PC printer business, and most of them are being used on individual desktops.

People didn't expect lasers to be hooked up to individual PCs when the LaserJet was introduced. It cost as much as or more than most PC configurations, and besides, not much software was around to support the then-new PCL codes embodied in the Canon-made engine's driver. Local area networks seemed a more logical target for these expensive but speedy and quiet machines.

Wrong. The LaserJet took off like a shot as individual users hooked it up to PCs. Office workers were tired of enduring hammering daisy wheel printers and whining dot-matrix printers, and a LaserJet's price didn't seem much to pay for a little peace and quiet. There were some inconveniences to using a LaserJet, but they seemed to be justified, at least most of the time. As a

result, while laser printers are still far from first place on a list of best-selling printers, thousands have been hooked up to individual PCs and, yes, thousands more have been hooked up to networks.

LaserJet inconveniences had a wide variety of influences on this market. For example, the original Canon engine had space for only 100 sheets of paper in its input bin and output tray. Sheet feeders

---

*'The assortment of lasers  
... carry on the tradition  
of flattering  
Hewlett-Packard by  
imitation.'*

---

that would handle large capacities, multiple bins of paper, and even envelopes began showing up early in the laser game. Some units came with collators that would assemble multiple copies of reports into the correct page sequence (the original LaserJet couldn't assemble even one copy into its correct sequence) and put letters together with their properly addressed envelopes.

Printer-sharing devices began to be touted as low-cost (non-LAN) answers to the high cost of laser printing. Many of them come with print-queuing and spooling capabilities that would put mainframe operating systems to shame, not to mention local area networks.

## Incompatibility/innovation

Software incompatibility provided a wide playing field for innovators with all sorts of solutions. Third-party utilities that magically transformed output designed for other printers into LaserJet format started showing up all over the place. Third-party vendors also produced LaserJet printer drivers compatible with popular software products, especially word processors and spreadsheets. Similar fixes and patches became available both in user groups and on bulletin boards, where the price was certainly right.

PC add-on cards appeared, and they too worked magic by transforming the LaserJet into something else. Boards that replaced the LaserJet's controller also came on the scene. Unfortunately, the LaserJet sometimes got transformed into something equally foreign to your software. On the other hand, a few products can now turn a LaserJet into a PostScript printer.

Software vendors were likewise excited by the new laser technology, and sooner than a lot of people expected, word processing and graphics vendors caught up with the LaserJet and began to ship compatible products as well as fixes for existing products. That meant the LaserJet had come of age, and users could rely on supported compatibility from original software vendors rather than add-on products.

As software support spread, LaserJet clones came along, stiffening the com-



petition Hewlett-Packard had to face. The challenge was quickly met by the LaserJet Plus, which accommodated more memory for graphics plus downloadable fonts to replace or supplement the company's expensive font cartridges.

The clones kept coming anyway, most of them meeting the capabilities of the Plus and many of them adding more features. Some of them gave you more memory and a better selection of fonts, while others gave you more paper capacity and even envelope handling, and still others had faster print engines and alternative printer emulations so you could use the printer with software that still didn't support the LaserJet. Many of them gave you those capabilities at a lower price.

## PostScript parallels

Lest we forget, a parallel laser-technology development started on the Apple Macintosh side of the PC universe. PostScript is generally acknowledged to be the most versatile page-description language available. The Apple LaserWriter was the first (and for a long time the only) printer to have it, and PostScript has set the standard for desktop publishing and many graphics applications.

## The harvest

The assortment of lasers reviewed here carry on the tradition of flattering Hewlett-Packard by imitation while improving the LaserJet breed and providing PostScript capabilities. Some of the emulations are built into the printers, and others come on cartridges the size of an ordinary credit card. Print-engine speeds

now range up to 18 pages per minute, and paper capacity can go up to a whopping 750 sheets.

You'll find a wide range of prices, features, quality, and performance in the laser market today. A few of these are genuinely poor choices, but most will give you lots to think about.

## Dataproducts LZR 1260

It's always a pleasure when a printer sets up logically and proceeds to do exactly what it's supposed to do. This is doubly true when 'doing what it's supposed to' means printing in PostScript or HP LaserJet Plus mode at 12 pages per minute. So it is with the Dataproducts LZR 1260. And given that the printer is meant to be a shared resource, the high price of \$15,540 doesn't seem exorbitant.

By far the most impressive feature of this printer is its speed. In LaserJet Plus mode, the text speed measured 11.1ppm. Results on the graphics speed test were even more impressive, and at 82 seconds per page, the LZR 1260 really shines — compared with 130 seconds and up for most other printers.

In PostScript mode, the text speed was slower, at 10ppm. But in the standard graphics test, the printer spat pages out at 16 seconds per page. And in the PostScript speed test, in which most PostScript printers take 18 or 20 minutes, the LZR 1260 clocked in at a mere seven minutes, 33 seconds.

Happily, the quality of the output is as impressive as the quantity. Graphics and text are dark and crisp. Graphics patterns retain details, filled-in areas are solid black, and text characters are clean and well-defined, even under a magnify-



ing glass. Although the Courier characters are just a bit thinner than what you would expect from a Selectric typewriter, the overall quality is as good as you'll find in any laser printer.

The secret to the LZR 1260's speed is a 68020 microprocessor. The CPU, plus 4Mbytes RAM, certainly pays off. It's also worth noting that the 35 Adobe fonts are the same as in the NTX. According to a Dataproducts representative, the printer is 100 per cent NTX compatible in its PostScript mode. The only practical difference worth noting is that the LZR 1260 provides you with the option of connecting to a parallel port.

Another strong point in this printer's favour is its paper-handling features. Based on the same Toshiba engine as the Toshiba PageLaser12, the LZR 1260 offers the same paper-feed options. A 250-sheet tray is standard, as is the manual-feed slot. A \$1560 dual-bin feeder, with 250 sheets per tray, brings the total capacity to 750 sheets. A \$1616 envelope feeder can handle up to 100 envelopes.

A potentially important limitation is that the printer can feed from only two bins in LaserJet Plus emulation, and the envelope bin is not one of them. In PostScript mode you can use any of the bins, either by going through PostScript drivers or by embedding the PostScript codes directly in your document.

Be forewarned that setting up this printer is not a trivial task. One of the complications is that the printer comes in two parts: the 27kg engine and the 11.5kg system unit. From the outside the system unit looks virtually identical to an AT. You have a choice. You can either stack the engine on top of it or mount the unit in a vertical floor stand (a floor stand comes with the printer).

Inside the system unit you'll find the printer controller, room for a hard disk, and room for further expansion by VARs

## Laser emulation grid explanation

Because so many printers offer a variety of high-quality typefaces, a chart of emulations and their characteristics appears near the beginning of each review. Within each chart there is one grid to represent the printer's native mode and another to represent the printer's highest-quality emulation. If only one emulation is available, its characteristics are displayed in the native-mode grid.

(Those laser printers that have a dot-matrix emulation are accompanied by a dot-matrix grid that displays the available pitches and enhancements. Please refer to the grid explanation within the introduction to dot-matrix printers.)

Across the top of each laser emulation grid, the four most commonly used typefaces are listed: Helvetica, Times Roman, Courier and Line Printer. Down the left side of the grid are the most commonly used point sizes: 8/9, 10, 12, 14 and SF. The 8/9 designation indicates that either 8-point or 9-point type is available. SF stands for scalable font, a term used to indicate that the emulation is capable of producing any point size (all PostScript printers have this feature).

Under each typeface in the grid are four columns with coloured squares representing commonly used printing enhancements: blue for bold, green for italic, yellow for super/subscript, and red for underline. The configuration shows which enhancements are available in each typeface and size.



# People Prefer Perfect Pictures

## JDL A2/A5 Engineering Workstation Plotter/ Printer

- ☐ 14 clear colours
- ☐ 180 dots per inch resolution
- ☐ Prints 5 times faster than conventional pen plotters
- ☐ HP emulation
- ☐ A large range of printer emulations including Epson, Diablo 630 etc.

Autoshade facility when used in conjunction with TCG's number nine range of graphics boards, for 3D solid modelling and shading

## Selko A3 & A4 Colour Hard Copy Device

- ☐ High resolution, high quality output
- ☐ Produces final output in less than 60 seconds
- ☐ 4,912 brilliant viewable colours



A full range of leading name graphics products – pen plotters, digitisers, graphics boards, monitors and scanners

**TCG**

WE'VE GOT THE  
PICTURE



## PRINTERS

(value-added resellers). The option of a hard disk makes good sense for a shared printer, because it lets you add fonts all in one place. Although the optional disk is not yet available, a Dataproducts representative said the system can already support 20 to 300Mbyte hard disks, so you can add your own.

Using the printer is far easier than putting it together. 'Yes' and 'No' buttons on the front panel, combined with a 16-character LCD that shows options in conventional English, furnish reasonably intuitive control. If you can't figure out the front panel, you'll quickly find the information you need in the excellent manual.

Clearly, this is not a printer for everyone. But if your needs are heavy-duty — particularly for PostScript graphics in

desktop publishing, for example — and you must have both PostScript and LaserJet Plus compatibility, the LZR 1260 is the right choice.

Think of it this way: to get the same compatibility with the LaserJet and the NTX, and the same speed for PostScript graphics, you could buy both a LaserJet and an NTX. But that would cost more, and you'd have two slow printers instead of one fast one. I'll take the LZR 1260.

**D Stone**

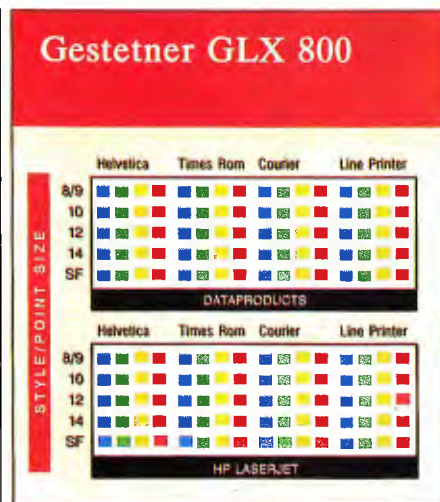
### Gestetner GLX800

The GLX800 model from Gestetner Lasers is the sole Australian-made laser printer to be evaluated, and stacks up well against the vast multitude of imported units. Gestetner Lasers, which is descended from the now-defunct Impact Systems, is the country's only developer of laser printers.

While it is built around the same Canon SX laser engine as most of the foreign units, the controller circuitry (featuring a 10MHz 68000 CPU and a custom-designed gate array) is completely designed and manufactured in Australia, at Gestetner's manufacturing facility in Sydney.

Options for the GLX800 include dual paper trays and duplex printing — the ability to print on both sides of the paper. The duplex printing capability is still just a 'wish list' item for many competing products, and has been a major selling point of the the GLX800.

Rated at eight pages per minute, the GLX800 features the usual 300 dots per inch resolution and includes a 1.5Mbyte internal buffer (expandable to 4Mbytes). Gestetner Lasers claims that the duty



cycle for the GLX800 is around 5000 pages per month, with the toner cartridge lasting for over 4000 pages.

A natty 16-character front panel LCD is used for the display of mode change and error messages, including a quaint little kangaroo which hops across the display while the system is warming up. Apart from this, there are very few giveaways that the GLX800 is an Australian-made product, as the overall finish and documentation quality are world-class.

As with most current laser printers, each input tray holds 200 sheets, while the output bins allow 20 sheets in the face-up position or 100 sheets in the face-down position.

Operation is comparatively quiet, compared to systems based around the older Canon CX engine or the popular Ricoh engine. While not actually printing, the GLX800 is remarkably quiet, except for a brief hiccup every 10 minutes or so, which can be a little startling in a quiet office.

### At a glance

#### Dataproducts LZR 1260

**Supplier:** Dataproducts

**Tel:** (02) 451 3533

**Price:** \$15,540

**Dimensions (HWD):** 45.7 by 48.3 by 53.3cm

**Weight:** 38.5kg

**Emulations:** HP LaserJet Plus; Post-Script

**In short:** Big, fast and expensive, the LZR 1260 offers compatibility with the Apple LaserWriter IINTX and the HP LaserJet Plus, as well as heavy-duty paper handling. Recommended for shared-printer needs, this is the one printer to get when you'd otherwise have to get more than one.

## The turbo powered printer

In today's world time waits for no man. Or woman.

Getting the job out on time can mean the difference between winning and losing.

That's where the Dataproducts LZR 1260 Postscript stands alone. It's got the fastest print output of any laser printer in it's class. And when time means money that's real peace of mind.

The LZR 1260 utilises the Adobe Atlas controller, has 35 resident fonts and when linked to an optional 20 megabyte hard disc gives you a range of typefaces that is virtually limitless.

Before you hook your PC up to any old laser printer. Take the Dataproducts LZR 1260 for a test drive. For more information call Dataproducts on (02) 451 3533

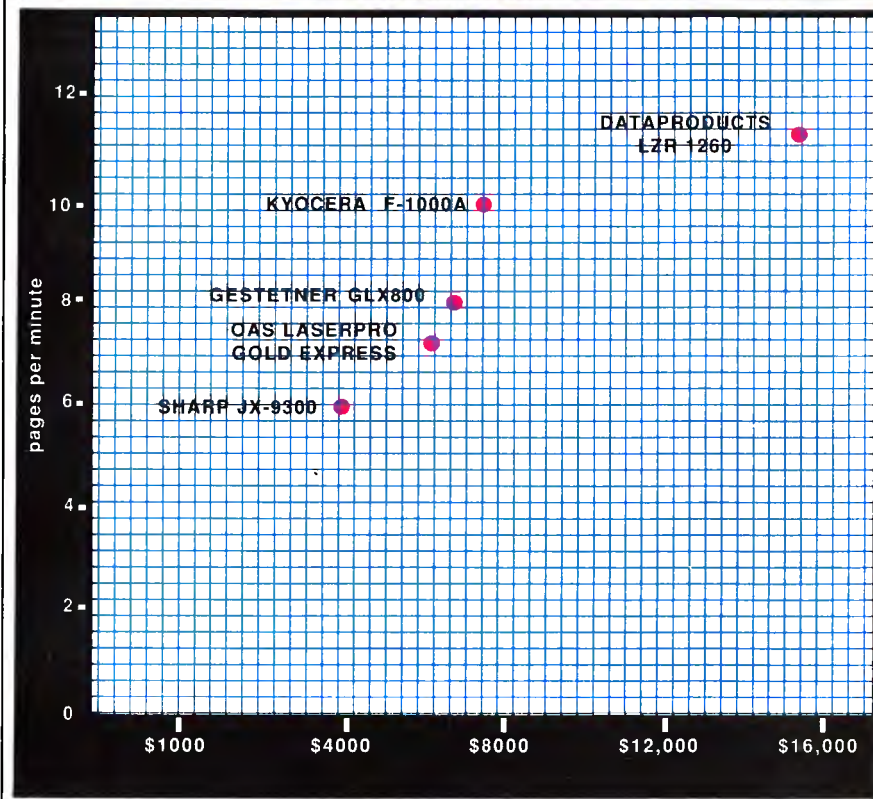
 **Dataproducts laser printers**

2/10 Rodborough Road, FRENCHS FOREST, 2086 PHONE: (02) 451 3533

Postscript is a trademark of Adobe Systems.

# PRINTERS

## LASER PRINTERS



The printers' prices plotted against their speed. For laser printers, the speed is measured in pages per minute

One excellent feature of the GLX800 is the dual serial and single parallel port inputs, which can all be connected at the same time. Automatic switching is supported between the three hosts (which can include a local area network), and

individual buffer sizes and time-outs can be set. The serial ports each support up to 38,000 baud connections, while the parallel port is of the standard Centronics format.

The GLX800 self-test is not the usual

## At a glance

### Gestetner GLX800

**Supplier:** Gestetner Lasers

**Tel:** (02) 406 6611

**Price:** \$6665

**Dimensions (HWD):** 26.3 by 45.4 by 48.2cm

**Weight:** 20kg

**Emulations:** HP LaserJet 2; Data-products Line Printer

**In short:** An Australian-made printer which stacks up well against the vast multitude of imported units. Well worth considering this high-end printer for small workgroups.

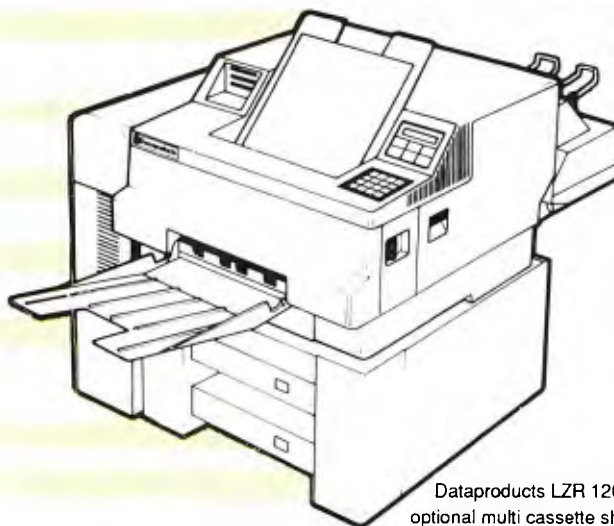
one-page wonder, but provides a multitude of details on currently loaded fonts and system options. PostScript support is available as an upgrade option, as are interfaces for IBM twinax and coax, and Wang VS/OIS.

Gestetner Lasers has positioned the GLX800 as a high-end laser printer for "small workgroups or busy single users," and this is the market where it has enjoyed the most success. The host-sharing facilities and multiple interfaces support the workgroup concept, although they are relatively useless for the single user. The GLX800 stands up very well on its own merits, and will represent a sensible purchasing decision for many users, without the aspect of patriotism ever becoming an issue.

**I Robinson**

### Kyocera F-1000A

With 79 built-in fonts, 25.8kg of mass



Dataproducts LZR 1260 shown with optional multi cassette sheet feeder and envelope feeder.



## ATLANTIS 286 80286 10 MHz

- 80286 10 MHz (Optional 80287-10)
- 640 RAM On Board Memory (Expandable to 16Mb)
- 1.2Mb Floppy Disk Drive
- Hard Disk/Floppy Disk Drive Controller
- Parallel Port
- Serial Port (Optional 2)
- Battery Backed Clock/Calendar
- Colour/Hercules Display Card
- 180 Watt Power Supply
- Mini at Case
- Front Panel Keylock/Reset and Turbo Switch
- Extended Keyboard with 101 Keys
- 12 Months Warranty Backed by Atlantis International Pty Ltd
- Assembled in Australia

from \$1845.00

## ATLANTIS XT TURBO 10 MHz

- 8088-2 10 MHz Motherboard
- 640K RAM Memory
- 360K Disk Drive
- Disk Drive Controller supports 2 Floppy Disks
- Serial Port Optional 2 RS232 Ports
- Parallel Port - Centronics with DB25 Connector
- Joystick Port
- Battery Backed Clock/Calendar
- Colour/Hercules Display Card
- 180 Watt Power Supply
- Keyboard PC/XT/AT - 84 Key
- Small F/print Case with Front Keylock, Reset and Turbo
- 12 Months Warranty Backed by Atlantis International Pty Ltd
- Assembled in Australia

from \$1149.00

## 3½" Internal DISK DRIVES

|                                                                   |              |
|-------------------------------------------------------------------|--------------|
| Mitsubishi 3½" 720K Drive/Steel Case/37 Pin Plug XT/AT Compatible | <b>\$179</b> |
|-------------------------------------------------------------------|--------------|

## ACCESSORIES

|                                                   |              |
|---------------------------------------------------|--------------|
| Keyboard Tactile 101 Keys. Switchable to PC/XT/AT | <b>\$132</b> |
| Printer Cable                                     | <b>\$15</b>  |

## MONITORS DATA-C

|               |              |                 |              |             |             |
|---------------|--------------|-----------------|--------------|-------------|-------------|
| Multisync 14" | <b>\$900</b> | DATA-C CGA      | <b>\$420</b> | Mouse Z NIX | <b>\$75</b> |
| DATA-C EGA    | <b>\$691</b> | 12" PAPER White | <b>\$158</b> |             |             |

## POWER SUPPLIES

|                           |              |
|---------------------------|--------------|
| Power Supplies 220W AT    | <b>\$220</b> |
| Power Supplies 180W AT    | <b>\$185</b> |
| Power Supplies 150W PC/XT | <b>\$125</b> |

## CASES

|                            |              |
|----------------------------|--------------|
| AT/XT Case Fliptop         | <b>\$120</b> |
| AT Case                    | <b>\$170</b> |
| Tower Case with 220W Power | <b>\$730</b> |

## DISKETTE DRIVE MITSUBISHI

|                                                 |              |
|-------------------------------------------------|--------------|
| Diskette Drive 5.25" 1.2 MB (Reads/Writes 360K) | <b>\$171</b> |
| Diskette Drive 3.5" 720 with 5¼"                | <b>\$202</b> |
| Diskette Drive 3.5" 1.44 MB with 5¼"            | <b>\$202</b> |
| Diskette Drive 5.25" 360K                       | <b>\$144</b> |

## HARD DISK DRIVES

|                                             |               |
|---------------------------------------------|---------------|
| 21 MB 5¼" Drive 65 MS Miniscribe            | <b>\$417</b>  |
| 21 MB 5¼" Drive 65 MS with Controller & Kit | <b>\$489</b>  |
| 42 MB 5¼" Drive 61 MS                       | <b>\$511</b>  |
| 42 MB 5¼" Drive 61 MS with Controller & Kit | <b>\$626</b>  |
| 42 MB 5¼" Drive 28 MS                       | <b>\$936</b>  |
| 42 MB 5¼" Drive 28 MS with Controller & Kit | <b>\$1080</b> |
| 71 MB 3½" Drive 26 MS                       | <b>\$1080</b> |
| 71 MB 3½" Drive 26 MS with Controller & Kit | <b>\$1230</b> |

BUY YOUR UPGRADES DIRECT AND SAVE

## DISK CONTROLLER CARDS

|                                                            |              |
|------------------------------------------------------------|--------------|
| Hard Disk (2X) Controller 8 Bit PC/XT                      | <b>\$151</b> |
| Hard Disk (2X) Controller 16 Bit AT                        | <b>\$229</b> |
| Hard Disk (2X) Controller 16 Bit AT (3X) Floppy Controller | <b>\$289</b> |

## VIDEO CARDS

|                                                                  |              |
|------------------------------------------------------------------|--------------|
| Mono, Hercules, Graphic Printer Port PC/XT/AT                    | <b>\$117</b> |
| Colour Graphics, Printer Port PC/XT/AT                           | <b>\$112</b> |
| GA, EGA, CGA, MGA, HGA, Multisync (Made in Aust), Double Scan PC | <b>\$299</b> |
| EGA                                                              | <b>\$255</b> |
| VGA, EGA, CGA, MGA, HGA                                          | <b>\$499</b> |

## MULTIFUNCTION CARDS

|                                                |              |
|------------------------------------------------|--------------|
| Parallel, Serial, Game Port 2 x 360K Zero K AT | <b>\$140</b> |
| Clock/Calendar Card PC/XT                      | <b>\$55</b>  |
| Printer Port PC/XT                             | <b>\$46</b>  |
| RS232 Port PC/XT                               | <b>\$72</b>  |
| Printer, RS232 (2nd Optional) AT               | <b>\$102</b> |

## PROCESSOR BOARDS & MOTHER BOARDS

|                                               |               |
|-----------------------------------------------|---------------|
| 8088-CPU Boards Turbo 4.77 & 8 MHz Zero K     | <b>\$159</b>  |
| 8088-CPU Boards Turbo 4.77 & 10 MHz Zero K    | <b>\$189</b>  |
| 8088-CPU Boards Turbo 4.77 & 10 MHz 640 K     | <b>\$659</b>  |
| 286-CPU Board 0 wait, 8 & 10 MHz Zero K       | <b>\$583</b>  |
| 286-CPU Board 1MB RAM, 0 wait 8 & 10 MHz      | <b>\$1332</b> |
| 386-CPU Board 2MB RAM on board, 0 wait 20 MHz | <b>\$4299</b> |

## DISKETTES

### "NO FRILLS" 3 1/2" DISKETTES

|               |               |
|---------------|---------------|
| Datalife 720K | <b>\$3.60</b> |
| 1.44MB        | <b>\$8.39</b> |

### 5 1/4" DISKETTES

|                     |               |
|---------------------|---------------|
| 10 Brand 2S 2D 360K | <b>\$0.99</b> |
| 1.2MB               | <b>\$3.50</b> |



## ATLANTIS INTERNATIONAL COMPUTERS

ATLANTIS INTERNATIONAL PTY LTD  
49 WADHAM PARADE, MT. WAVERLEY, VIC. 3149  
Phone: (03) 807 3139, 807 7187 Fax: (03) 807 6824  
Bulletin Board PH.: (03) 807 9514

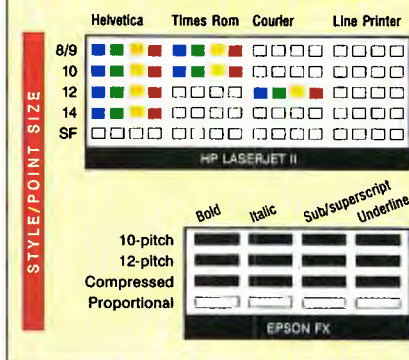
Phone: (03) 561 1133

Atlantis Engineering Services  
Atlantis Wholesale Computers  
Atlantis Office Automation



## PRINTERS

### Kyocera F-1000A



and the ability to emulate seven printers, Kyocera's 9.4-page-per-minute F-1000A belongs in the heavyweight division of LaserJet-compatible printers.

Bells and whistles make the \$7395 F-1000A a worthy choice for a wide range of specialised laser-printing applications, but if you stick close to the mainstream of word processing and databases, you'll find you don't often make use of the bulk of the specialty features. And you'll wish you could have a few strong words with the committee that chose those 79 resident fonts — half of them picked out of a hat, apparently.

In addition to the expected mix of Courier and Line Printer fonts found in any LaserJet Series II compatible, the F-1000A provides elite (12-pitch), Gothic (10-pitch), and mini-lineprinter (21.4-pitch, good for 170 characters across), along with eight and 10-point Times Roman and eight-point Helvetica knock-offs — all in both portrait and landscape. So far, so good. But there's no 12 or 14-point Times Roman, and the only Helvetica fonts above eight points are bold and bold italic — no light roman or light italic.

Kyocera builds its own laser printer engines. Operating costs are lower than many other printers because you replace the toner (every 3000 pages) and the printer drum (after 10,000 pages) separately, unlike the case with HP's one-piece cartridges.

You do have to be cautious changing toner (pull the safety tab clumsily and you'll crop-dust your shirt or blouse). The Kyocera engine is rated at 10ppm and actual throughput is 9.4ppm. Although the Kyocera print quality is good, you will probably find the HP's output slightly better.

The F-1000A has a 512k memory (upgradable to 1.5Mbytes), correct-order paper stacking, parallel and serial ports, accurate graphics emulation of the LaserJet Series II, six common dot-

*'Bells and whistles make the F-1000A a worthy choice for a wide range of specialised laser-printing applications.'*

matrix and daisy wheel printers, and a just-the-facts front panel (on/off-line, form feed, print status sheet, manual feed). The F-1000A allows you to:

- Load frequently used graphics such as company logos onto plug-in IC cards (they're like font cartridges, only smaller). Two slots are available.
- Generate bar codes automatically without having to buy special bar-code software.
- Create specialty type effects using three built-in 'Dynamic' fonts. You can stretch, slant and flip fonts to your heart's desire, although you'd be hard-

### At a glance

#### Kyocera F-1000A

**Supplier:** Imagineering

**Tel:** (02) 697 8666

**Price:** \$7395 with 1Mbyte RAM; \$8405 with 1Mbyte RAM upgrade

**Dimensions (HWD):** 26.7 by 36.8 by 44.5cm

**Weight:** 25.8kg

**Emulations:** Diablo 630; Epson FX; HP LaserJet Series II; IBM 5152 Graphics Printer; Line Printer; NEC Spinwriter; Qume Sprint II

**In short:** The English-like Prescribe programming language, built-in hex and bar code printouts, and the ability to turn graphics or specialty fonts into accessory IC cards make the F-1000 good for specialty applications.

pressed to think of many *serious* business applications that look like this:

## VARIATIONS

• Switch fonts, printer emulations, or paper orientation, and draw graphics objects (lines, circles, shaded blocks, even simple bar charts) using the robust Kyocera Prescribe command language. You use Prescribe as a supplement or a plain-English substitute for the arcane escape sequences found in the printers the F-1000A emulates.

As with other lasers with built-in fonts, if you tell your software you have an HP and call for an HP font (for instance, Z-cartridge 10 TMS RM), the Kyocera takes its best stab from its internal fonts. Results are usually good, but sometimes justified text doesn't print exactly even at the right margin. Double open quotes (") in PageMaker threw off the right margin;

**AT 11 PAGES  
A MINUTE  
PANASONIC'S NEW  
LASER PRINTER IS  
A LONG WAY AHEAD...**

### OF THE COMPETITION

The Panasonic KX-P4450.

At 11 pages per minute there's few faster in its class... with a lot behind at only 6-8 ppm.

- ☐ Two A4 250 sheet cassettes standard
- ☐ Compact size ☐ 12 resident fonts
- ☐ 5 printer emulation modes standard for compatibility with popular software.
- ☐ Standard RS-232C Serial and Centronics parallel ports
- ☐ Standard 512 RAM with optional memory expansion to 1.5 MB
- ☐ Convenient front panel controls with 15 character, LCD Display for messages
- ☐ RRP \$5995.00

**Panasonic**  
Office Automation

Call Panasonic now for the address of your nearest dealer. PHONE NSW: 886 0212 • VIC: 565 1400 • QLD: 268 6455 • SA: 268 8622 • WA: 451 7211

U560



*Plot your  
course  
to C&PA...*



**BUY A  
HOUSTON INSTRUMENTS  
DRAFTING PLOTTER AND GET A**

★ **CAD-PACK**

TURN YOUR PC

INTO A

CAD  
SYSTEM



• CAD-PACK  
INCLUDES:  
• DIGITISER  
• SOFTWARE  
• CABLE

**HOUSTON  
PLOTTERS**

| MODEL     | SIZE  | PENS |
|-----------|-------|------|
| DMP 42    | A1    | 1    |
| DMP 52    | A1    | 1    |
| DMP 52 MP | A0-A4 | 14   |
| DMP 56    | A0-A4 | 1    |
| DMP 56 MP | A1    | 6    |
| DMP 61    | A1    | 1    |
| DMP 61 MP | A0-A4 | 6    |
| DMP 62    | A0-A4 |      |
| DMP 62 MP | A0-A4 |      |

**OFFER ENDS  
DECEMBER  
1988**

\* with every A1 or A0  
plotter purchased

ALL INCLUDE 1 YEAR MANUFACTURERS WARRANTY

**C&PA**

The Computer Specialists

Vic (03) 544 3444

NSW (02) 891 3699

SA (08) 363 1900

Qld (07) 352 5788

Distributors:

WA (09) 242 2622

ACT (062) 85 1755

*Contact C&PA For Your  
Authorised Houston  
Instruments Dealer*



Impossible?

Impossible?

# IT WOULD one print happens to

Since when has paper been of a uniform size or thickness?

An obvious question, perhaps, but one that only a single printer on the market today will answer satisfactorily.

It's the LQ 2550 and, naturally, it's

made by the company that's at the forefront of printer technology: Epson.

The Epson LQ 2550 24 pin dot matrix handles more than just continuous sheets, or single sheets, or envelopes, or graphics.

Its skills extend to the lot.

And because it has advanced paper handling, the Epson LQ 2550 will skip from one different size or thickness, to the next, at the touch of a button.

Different paper textures are no problem, either. Nor is colour printing

Impossible?

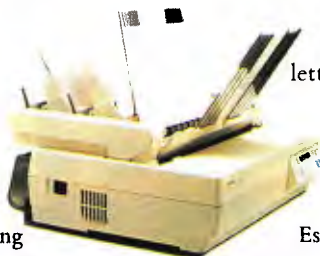


Impossible?

BE for any  
er, unless it  
be an Epson.

(the LQ 2550 gives you a range of seven for quite spectacular business graphics).

There are also seven fonts to select from and the LQ 2550 will print them all at the lightning



-quick speed of 133 letter perfect characters every second.

Impressive, and that is an understatement. Especially when you

realise that all this is possible only in the minds of other printer companies.

Not their machines.

**EPSON**

**THE RIGHT DECISION.**

For more information phone: Sydney (02) 4360333, Melbourne (03) 5436455, Brisbane (07) 8325400, Adelaide (08) 3731377, Perth (09) 3251744, Auckland (09) 598499, Wellington (04) 852494

C&MA EPS0013



### Seikosha SBP-10AI

features unprecedented high speed dot matrix printing - 800cps draft, 400 cps correspondence and 200 cps near letter quality. Also boasts rear, bottom and front paper paths and bi directional push pull tractor.



### Seikosha SP-1600AI

this value packed printer features printing speed of 160 cps draft and 40 cps NLO, is Epson FX and IBM Graphic Printer compatible and quiet.

### Teac Disk Drives

Available in 3 1/2 and 5 1/4" formats. There's four models to match your systems requirements in 1, 1.6, 1/1.6 and 1/2 MB



### Graphtec Large Format Plotters A0 & A1 Size.

Superior design for high throughput and precision plotting. Compatibility with most off the shelf software packages.



# The whole world's behind you

### New ECP® 3000 Projection System from Electrohome

Delivers crisp, clear images on screens 25 feet diagonal. From your colour monitor to large audiences.



### OMS-PS® 810

Can compose and print the most complex pages in record times, with richer, more saturated blacks than ever before. Power of Adobe PostScript. Along with PostScript, the HP Laser Jet +™, Diablo® 630 and HP-GL™ printer emulations are added for your non-PostScript software.

### Graphtec Cutting Pro Series

Can be used to produce low-cost adhesive window display signs, promotional stickers for sales reps' cars, and company logos. The plotting function can be used to produce price cards for in-store point-of-purchase displays, illustrations for product packaging and posters. Wide-tip art pens for colourful drawing.



### Hitachi 20" Colour Display Monitor CM2086A

Ideal for all CAD/CAM applications and features ultra high resolution, a wide range of scanning frequencies and a high performance compact chassis.



**W**hen you choose computer peripherals from AWA Distribution you get more than just a good printer, plotter, disk drive or tape drive. The products we stock are not only the best the world can offer and have gained worldwide acceptance for their versatility and dependability. They are also marketed and serviced by a company you know you can trust - Australia's largest electronics company, AWA Limited. Call us today and you will be a whole world better off.

## AWA Distribution

112-118 Talavera Road, North Ryde, NSW 2113

NSW (02) 888 9000 Vic (03) 560 4533 Qld (07) 844 1631 WA (09) 244 2884 Tas (003) 44 5155 SA (08) 272 2366

## PRINTERS

the same text printed in XyWrite was flawless, but a Ctrl-1 tab stop destroyed the right margin elsewhere in the document.

Another quirk: with the LaserJet Series II, if you stick a single sheet (your company letterhead, for instance) in the manual-feed slot, the printer is smart enough to guess your intentions and use the single sheet without requiring special escape codes. The Kyocera isn't.

In our tests and through several thousand pages of day-to-day use, the F-1000A performed well. Print quality remained good, and there was no sign of the paper jamming that plagued its predecessor. If you need Kyocera's programmability, if you need small type sizes to tame big spreadsheets, or if you frequently print documents in landscape mode and want more than HP's two

landscape typefaces, the Kyocera F-1000A could be for you.

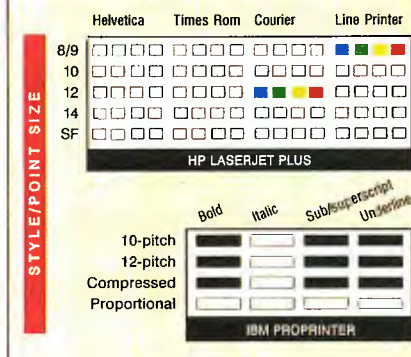
**B Howard**

### OAS LaserPro Gold Express

The LaserPro Gold Express, from Office Automation Systems, is the new flagship in the LaserPro line. Priced at \$6100, it is the kind of printer that can confuse a novice or delight a power user. It is most useful as a platform for programmers who need the printer's Express language. If flexibility is what you're looking for, the Gold Express is a good place to start.

In many ways, the LaserPro Gold Express is identical to the Silver Express, the only differences being an extra

### OAS LaserPro Gold Express



megabyte of memory and an additional emulation mode.

Standard memory for the Gold Express is 2.5Mbytes. You can also get a 2Mbyte upgrade to the Pure Gold Express, yielding a total of 4.5Mbytes. The extra memory can be important for those who use full-page graphics and downloaded fonts.

Printer emulations include Diablo 630, Qume Sprint II, NEC Spinwriter 3550, Epson FX-80, HP LaserJet Plus and IBM Proprinter. These emulations should cover most software that knows how to use any printer at all, but Office Automation Systems supplies a generic line-printer mode also, just in case.

In graphics emulation tests for the Epson FX, LaserJet Plus, and IBM Proprinter modes, and in text emulation tests for these three plus the Diablo mode, the Gold Express performed without problems. One nice touch is that

# Quick Cure.

End the frustration of sharing expensive print devices (and waiting for output to finish) with the Diamond Systems Parallel Printer Qr.

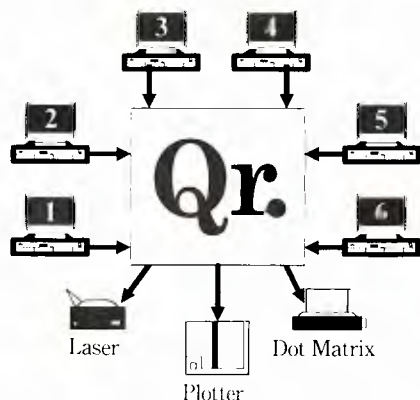
Desktop Publishing and laser printers in mind.

Control the PPQr with pop-up menu software which can be invoked while you are inside your application program.

Local design, manufacture and full support make the PPQr 100% Australian.

Everyone in your office will think they have their own ultra high speed laser printer or plotter.

Cure all your print management ills with the Parallel Printer Qr from Diamond Systems.



With up to 6 inputs, 3 outputs and 3 Mb of buffer, the PPQr can handle all the print resource management tasks in a small to medium-sized office.

At very healthy speeds. The PPQr has been specially designed with

GRANDELUSION DS 003

# Qr.

## DIAMOND SYSTEMS

7 Barreenong Rd, Cottles Bridge, Victoria  
PO Box 105, Hurstbridge VIC. 3099  
Tel (03) 714 8269 Fax (03) 714 8554

### At a glance

**OAS LaserPro Gold Express**

**Supplier:** Kenelec

**Tel:** (03) 560 1011

**Price:** \$6100

**Dimensions (HWD):** 31 by 41.5 by 44.5cm

**Weight:** 22.9kg

**Emulations:** Diablo 630; Epson FX-80; HP LaserJet Plus, HPGL; IBM Proprinter; NEC Spinwriter 3550; Qume Sprint II

**In short:** The new flagship in the LaserPro line is of special interest to programmers who can make use of the LaserPro Express language, particularly in concert with the HP plotter emulation for CADD/CAM applications, or with the printer's two to 4.5Mbyte memory for desktop publishing.



## PRINTERS

the printer treats boldface and italic as enhancements, even in LaserJet Plus emulation, so you can use these features even if you don't have a boldface or italic font loaded. Resident fonts include Courier, Elite, Vetica (similar to Helvetica) and two sizes of Line Printer.

Print quality varies somewhat with the emulation. Graphics are generally good, maintaining detail in patterns and filling solid areas with a dark black. The one exception in our tests was in Epson FX emulation, which repeatedly left white specks in solid black areas. Text quality is excellent and more consistent, with no significant differences among emulations.

On the text speed tests, the Gold Express clocked in at 7.1ppm in the Diablo mode and 7.2ppm in the other modes tested. In the graphics speed tests, it managed 38 seconds in Epson FX mode and 53 seconds in IBM Proprinter mode, but it was slower in LaserJet Plus mode, at 150 seconds.

Setting up the LaserPro Gold Express is straightforward. Unfortunately, using the printer is more difficult than installing it because of the obscure two-digit codes in the front-panel display.

Since the printer comes set to LaserJet Plus emulation, you can immediately

use the Gold Express with any software that includes a LaserJet Plus driver. But plan to take time to learn where the definitions of codes are hidden in the manual.

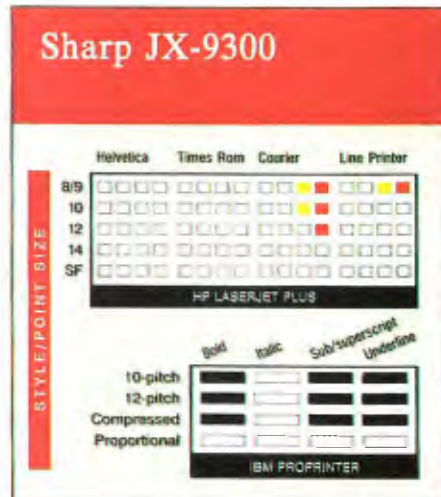
The LaserPro Gold Express will be most appreciated by those who can make use of the Express command language. The language can generate bar codes and fonts. It also includes graphics primitives — boxes, circles, arcs and fills — that you can use to build graphics or forms with your own programs.

As should be clear, the LaserPro Gold Express should be of most interest to programmers — whether as in-house programmers, consultants, or VARs. And even for those who can take advantage of the Express language, the LaserPro Silver Express may be all you need. However, if you want the Express language and need the extra memory or the plotter emulation, by all means go for the gold.

**D Stone**

### Sharp JX-9300

Everyone's getting into the act. Sharp's JX-9300 is yet another good quality, competitively priced laser printer. By it-



self it's not exciting except for its multiple emulations. But the JX-9300, at \$3995, constitutes a good example of the quality you can get for just under \$4000.

The JX-9300 is a rated six-page-per-minute printer with the standard 300 by 300 dots per inch maximum printing resolution. The machine actually tested faster than its rating, attaining an average speed of 6.1ppm.

Both parallel Centronics and 25-pin serial interfaces are standard, as is facedown, collated paper output. An op-

**NEW**

**OKI**

## 390 SERIES

**THE WORKHORSES FOR THE BUSY OFFICE  
SUPERB QUALITY 24 PIN PRINTERS  
Models 390 391 393**

**Exceptional LETTER QUALITY from 90cps  
Fast DRAFT printing to 450cps  
Bit Map GRAPHICS 360 x 360 dpi  
Superb paper handling**

#### FEATURES:

Compatible with EPSON LQ, IBM PROPRINTER X24/XL24

- 80 col or 136 col
- Letter Quality 90, 120cps
- Draft 270-400cps
- Menu selection
- Font cartridges
- Graphics 360 x 360
- Paper parking
- Original + 3 copies
- Rear & bottom feed
- CSF (Option)
- Noise < 57db
- 393 Colour option

SUIT IBM PC, XT, AT & COMPATIBLES

**RIBBONS, ROLLS & PRINTERS**

PTY LTD

99 New Illawarra Road BEXLEY NORTH, NSW 2207  
Ph: (02) 50 0315 Fax: (02) 502 1552

## Laser printers that mean business.

1.5MB standard memory. Inbuilt host sharing. Dual bin and double-sided printing options. 10MHz 68000 based controller with custom gate-array—delivers graphics up to 20% faster than the HP Laserjet Series II. These are just some of the reasons you should look at Gestetner Lasers GLX800 8 page per minute laser printer.

Need even faster output? Look at our L2000 20ppm range. Fully compatible with our GLX800 models.

Also available is a wide range of HP compatible font and emulation cartridges. Current emulations include Epson FX400, Diablo 630 ECS, Qume Sprint 5/9, HP plotter 7470 and DEC LQ P02.

The GLX800 puts more usable printing power on your desk than any other printer in its class.

All our printers are backed by a nationwide service and support network. All are designed and built right here in Australia.

Call Gestetner Lasers today for the full story.

**Gestetner Lasers**

**Call your state sales office**

Sydney (02) 436 1222  
Melbourne (03) 509 7211

Brisbane  
Adelaide  
Perth

(07) 252 1369  
(08) 332 9533  
(09) 481 0027

A collection of wrapped gifts on a red surface. A large gift is wrapped in black paper with colorful polka dots and a gold ribbon bow. A smaller gift is wrapped in black paper with a floral pattern and a red ribbon bow. A pair of scissors with orange handles and a gold ribbon are also visible. A card with the text "Number from 1" is partially visible.

**Word Fun 1**

*"A great book for the young reader who is looking for a new challenge." — The New York Times*

**Peter Dinklage**

**Harcourt Brace Jovanovich**

**\$39.95**

**\$29.95**

**\$39.95**

## Lex - Ages 10 - Retirement

A magical adventure through the Word Forest of Futhorc in the search for Lex the Wizard of Words

## Word Fun 1 - Ages 5 - 15

Use the helicopter of the Semantic Squadron to rescue those who lost their way in the forest

## Number Fun 1 - Ages 5 - 15

9 levels of difficulty and 9 speeds. Random number generation so no two games are ever the same

## Spelling Fun 1 - Ages 5 - 15

Two games. Escape from Lex's castle or keep the Spelling Serpent locked away  
In an exciting race against time

**Reckon Software Pty Ltd**  
706 New South Head Road  
Rose Bay NSW 2029  
Call us on **(02) 371 9222**  
or fax your order to **(02) 371 0098**

**FREEKID<sup>®</sup>**  
 1-800-854-4545  
 15 YEARS

Please send me \_\_\_\_\_ ) Economy Packs at \$99.00  
or send me:  
☐ Lex Wizard of Words @ 39.95 ☐ Number Fun 1 @ 29.95  
☐ Word Fun 1 @ 39.95 ☐ Spelling Fun 1 @ 39.95  
I enclose a cheque/money order/Bankcard/ Visa  
for (\$ \_\_\_\_\_ ) plus \$6 postage and packing

NAME: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_

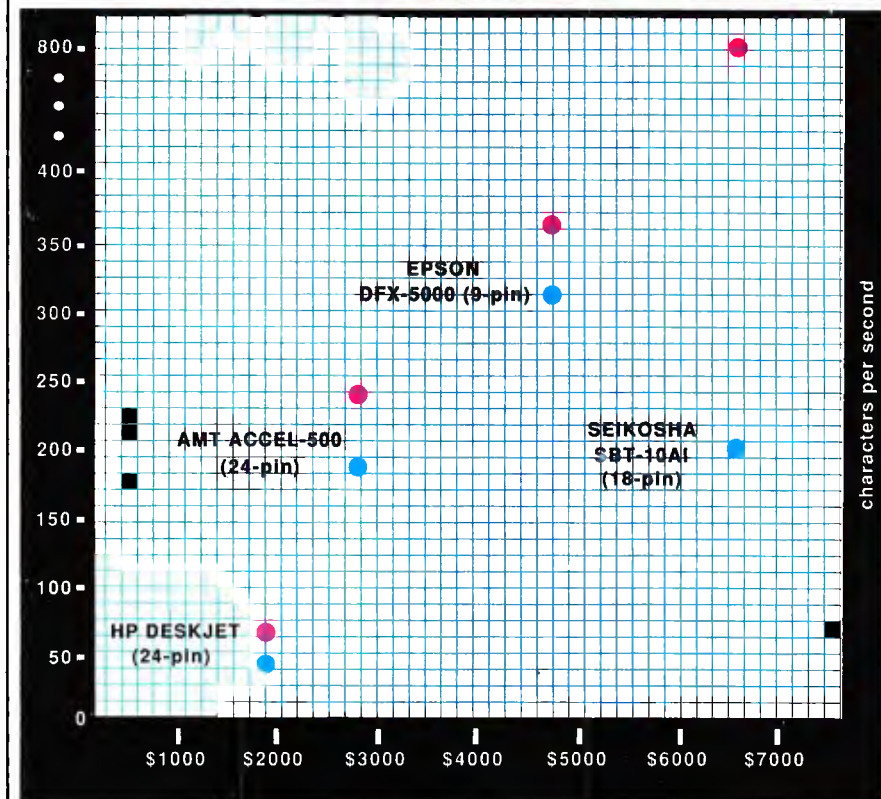
BANKCARD  
OR  
VISA CARD NO.

**BANKCARD  
or  
VISA CARD NO.**



# PRINTERS

## DOT-MATRIX PRINTERS



Price of printers plotted against their speed (characters per second). It is important to note the difference between 9, 18 and 24-pin printers

tional \$31 faceup paper tray is available. Paper can be fed manually, but usually it comes from the single letter-sized 100-sheet-capacity cassette. Standard RAM is 512k with a 1.5Mbyte expansion option available for \$1029.

The Sharp has several standard emulations. It can emulate the HP LaserJet Plus, Epson FX-80, IBM Graphics

Printer, IBM Proprinter and Diablo 630. You'll be hard-pressed to find PC-based business software that won't run on at least one of those emulations. About the only type of output missing is HP plotter emulation or colour printing.

After speed and printer emulations, the next-hottest question is built-in fonts. Fortunately, the JX-9300 has the same standard fonts as the HP LaserJet Plus. Unfortunately, that means only two: Courier and Line Printer. This is the one area where Sharp should beef up this machine. HP doesn't include more fonts, so it falls on the shoulders of competitors to supply more in every category. An additional three or four fonts could make a world of difference, at least in perceived value.

This printer uses a three-piece system for replaceable supplies, with a separate photoconductor drum (\$309 and good for 30,000 pages), developer cartridge (\$154 and 10,000 pages), and toner cartridge (\$103 and 5,000 pages). The various components slide easily into the printer.

The front-mounted control panel uses membrane buttons, seven LED indicators and a two-character LED status

### At a glance

**Sharp JX-9300**

**Supplier:** MPA

**Tel:** (03) 894 1500

**Price:** \$3995

**Dimensions (HWD):** 31.7 by 41.3 by 41.9cm

**Weight:** 17.5kg

**Emulations:** Diablo 630; Epson FX-80; HP LaserJet Plus; IBM 5152 Graphics Printer, Proprinter

**In short:** Sharp's JX-9300 isn't particularly fast, and it comes standard with only Courier and Line Printer fonts, but it has the five most significant printer emulations, 512k RAM, and an aggressive price.

# WARNING

TO ALL **tum** and **mitac** DEALERS and PURCHASERS

BEWARE OF SEVERAL GREY MARKET SUPPLIERS. FOR YOUR PROTECTION AND VALIDITY OF THE GENUINE MANUFACTURERS WARRANTY, CALL KELLER AUTOMATION NOW TOLL FREE 008-331 715 FOR YOUR NEAREST AUTHORISED DEALER.



# FULL HOUSE ♠<sup>TM</sup>



TRADEMARKS REGISTERED

FULL HOUSE ♠ T.V.M. - Taiwan Video and Monitor Corp. NEC MULTISYNC - NEC Home Electronics (USA) Inc. IBM VGA PGA EGA CGA MDA 1270 1PS/2 - International Business Machines Corp. Hercules - Hercules Computer Technology. Apple Macintosh II. Mac SE. Apple Computer Inc. Olivetti - Olivetti & Co. S.p.A. Gem Digital Research Inc. Ventura - Xerox Corp. PageMAKER - Aldus Corp. AutoCAD - Autodesk Inc. Symphony - Lotus - Lotus Development Corp. Windows - Microsoft Inc. Framework II - Ashton Tate Inc. Wordperfect - Wordperfect Inc. Wordstar - MicroPro Inc. TGA TAXAN - Raja Electronics Co. - Texas USA Corp. VEGA - Video Seven Inc. GENOA - Genoa Systems Corp. AT&T - American Telephone and Telegraph Co. SONY - Sony Corporation. EGAMAX 860 - Prisma Graphics Systems Inc. EVA - Tseng Labs.

Whatever your **Computer type** . . .  
 Whatever your **Brand of PC** . . .  
 Whatever your **PC Video Card** . . .  
 Whatever your **Software** . . .  
 Whatever your **Upgrade task** . . .  
 Whatever your **Future needs** . . .  
 Whatever your **VCR, Video Disk** . . .  
 Whatever your **Location** . . .  
 Whatever your **Budget** . . .

... **TVM**, World Leaders in Monitor technology, have produced the All-new, **ALL-IN-ONE\*** Multisync/2 **MD-11®** Colour & **MM-11®** Mono 3rd Generation Multisync **FULL HOUSE ♠<sup>TM</sup>** Monitors.

Now both in stock, together with the **EGAMAX-860 Card**, they offer the Ultimate in Compatibility\*.

They fully support:

- \* **VGA** Analogue (New IBM PS/2)
- \* **Apple Macintosh II & Mac SE**
- \* New **CAD/CAM 800 x 600 Std 132 x 45, 32, 29, 25 or 80 x 66 Text** with window driven utilities and **ALL Drivers** for **GEM, VENTURA, PageMAKER, AutoCAD, Symphony, Lotus, WINDOWS, Framework II, Wordperfect, Wordstar.**

- \* **PGA, EVA/TGA/GENOA 640 x 480**
- \* **EGA 640 x 350, VEGA 752 x 410**
- \* **Olivetti-AT&T CGA II 640 x 400**
- \* **CGA 640 x 200, Hercules, MDA**
- \* **IBM 3270 (Models 2, 3, 4 & 5)**
- \* **PAL/NTSC Composite Video/Audio**

| FULL HOUSE ♠    | by TVM | NEC     | TAXAN   | SONY    |
|-----------------|--------|---------|---------|---------|
| CRT Size (True) | 14"    | 13"     | 14"     | 11"     |
| Dot Pitch mm    | .31    | .31     | .31     | .31     |
| Horizontal Res. | 1024   | 800     | 800     | 820     |
| Vertical Res.   | 768    | 560     | 600     | 600     |
| Horz. Scan KHz  | 15-39  | 15.7-35 | 15.7-37 | 15.7-37 |
| Vert. Scan Hz   | 45-75  | 50-80   | 50-60   | 50-60   |
| Video Band      | 32     | 30      | 30      | 30      |
| MONO Version    | YES    | NO      | NO      | NO      |
| CGA Card        | YES    | YES     | YES     | YES     |
| Hercules Card   | YES    | NO      | YES     | YES     |
| EGA Card        | YES    | YES     | YES     | YES     |
| PGA Card        | YES    | YES     | YES     | YES     |
| 800 x 600 Card  | YES    | NO      | NO      | NO      |
| VGA (IBM PS/2)  | YES    | YES     | NO      | NO      |
| Apple Mac II SE | YES    | NO      | NO      | NO      |
| 132c x 45r Text | YES    | NO      | NO      | NO      |
| 3270 (2,3,4,5)  | YES    | NO      | NO      | NO      |
| PAL/NTSC Video  | YES    | NO      | NO      | YES     |

True 14", Superdark, Non-Glare, Flicker-Free Screen. Easy on the eyes.

The Unique Lock-On-Contrivance **LOC®** circuit which **Automatically** locks on to any **Scan** frequency from **15 to 39 KHz Horizontal**, and **45 to 75 Hz Vertical**.

Optional **PAL/NTSC Composite Video & Audio Signal Decoder (TVMouse)** for using the **MD-11** as Superhigh resolution **Monitor for VCR, TV, Video Disk, Camera, Teletext** or external video Games.

EGAMAX 860

MM-11

MD-11

**TVM**

**KELLER AUTOMATION**

**Exclusive Australian Distributors**

3 Walker Street, Braeside, Victoria 3195  
 Telephone: (03) 580 1355 Fax: (03) 587 3373

MELBOURNE • SYDNEY • NEWCASTLE • BRISBANE  
 HOBART • ADELAIDE • PERTH • AUCKLAND



# Two new DESQviews.

## They're everything you want in windowing environments.

## And less.

DESQview™ is the operating environment that brings OS/2™ power to DOS. And it lets you, with your trusty 8088, 8086, 80286, or 80386 PC, leap into the next generation in PC productivity. For not much money. And without throwing away your favorite software.

### Introducing DESQview 2.2

And now, DESQview 2.2 adds capabilities, performance, and compatibility enhancements you've been asking for:

Like being able to fine tune DESQview performance "on the fly." Run Lotus Express and Metro. And the Intel Connection Co Processor. Even use the DOS 4.0 shell with DESQview. Have DESQview automatically install Quattro, Sprint, Aldus PageMaker, Microsoft Excel, Word Perfect, Dataease and as many as 80 other programs. And using the DESQview API, be able to dynamically link them.

### More bang; less bytes

While other programs get bigger, we've worked to make DESQview smaller. And we've succeeded in a big way on PCs and PS/2's with extended, EMS 3.2 (AboveBoard), EEMS and EMS 4.0 memory—as well as on 386 PCs and PS/2s. For example, DESQview overhead on EMS 4.0 and 386 PCs can be as low as 10K on EGA/VGA PCs. And

For programmers, DESQview's API, with its strengths in inter-task communications and multitasking, brings a quick and easy way to adapt to the future. With the API's mailboxes and shared programs, programmers are able to design programs running on DOS with capabilities like those of OS/2.



DESQview actually *increases* memory 30K on CGA PCs; 20K on monochrome and Hercules PCs. That's good news for users of big desktop publishing, CAD and database programs.

### Introducing DESQview 386

For users of 80386 PCs and PS/2s (or PCs with 80386 add-in boards, such as the Intel Inboard 386), there's DESQview 386 (a combination of DESQview 2.2 and the new QEMM-386 Quarterdeck Expanded Memory Manager, version 4.2).

DESQview 386 gives you extraordinary power. Run text, CGA, EGA, VGA, and Hercules programs in windows and in the background. Run 32-bit 386 programs,

like Paradox 386, and IBM Interleaf simultaneously with your favorite DOS programs. All with the speed and performance you expect out of your 386. And with protection against 'misbehaved' programs.

### Promise and performance

And, of course, both DESQviews have all the features that made prior versions the popular choice in operating environments. The ability to multi-task in 640K and beyond. View programs in windows or full screen.

Did you buy another environment that hasn't lived up to your expectations? Trade up to new DESQview. See coupon below.

Transfer data. Access DOS via menus. Dial your phone. And create keystroke macros within and between programs.

### Our story gets better and better

If there's any doubt about our commitment to your PC and PS/2 productivity, just look at our accomplishments over the years. We think you will understand why PC Magazine gave

DESQview its Editor's



Choice Award for "The Best Alternative to OS/2," why readers of InfoWorld twice voted DESQview "Product of the Year," why, by popular vote

at Comdex Fall for two years in a row, DESQview was chosen "Best PC Environment" in PC Tech Journal's Systems Builder Contest. DESQview lets you have it all now.

DESQview System Requirements: IBM Personal Computer and 100% compatibles (with 8086, 8088, 80286, or 80386 processors) with monochrome or color display; IBM Personal System/2. Memory: 640K recommended; for DESQview itself 0-145K. Expanded Memory (Optional): expanded memory boards compatible with the Intel AboveBoard; enhanced expanded memory boards compatible with the AST RAMpage; EMS 4.0 expanded memory boards. Disk: two diskette drives or one diskette drive and a hard disk. Graphics Card (Optional): Hercules, IBM Color/Graphics (CGA), IBM Enhanced Graphics (EGA), IBM Personal System/2 Advanced Graphics (VGA). Mouse (Optional): Mouse Systems, Microsoft and compatibles. Modem for Auto-Dialer (Optional): Hayes or compatible. Operating System: PC-DOS 2.0-4.0; MS-DOS 2.0-3.3. Software: Most PC-DOS and MS-DOS application programs; programs specific to Microsoft Windows 1.03-2.1, GEM 1.1-3.0, IBM TopView 1.1. Media: DESQview 2.0 is available on either 5-1/4" or 3-1/2" floppy diskette.

Trademarks are property of their respective holders: IBM, OS/2, PS/2, Lotus, Express, Metro, Quattro, Sprint, Aldus, PageMaker, Intel, Above Board, Inboard, Hercules, Mouse Systems, Hayes, Microsoft, Windows, Excel, Word Perfect, Dataease, Paradox 386, Interleaf, TopView.

# Quarterdeck

Santa Monica, California USA

Available From:

Sourceware 586 Pacific Hwy A4, Chatswood, NSW 2067 (02) 411 5711

Computer Peripherals Wellington, New Zealand (644) 734 291



# PRINTERS

screen. Besides overseeing normal paper handling, the control panel sets the number of copies, paper size, portrait or landscape printing orientation, a backup feature, hex dump, printer interface and emulation and emulation-specific settings such as character sets, pitch and emphasised print. Its two-character setting codes are more primitive than those that appear on the 16-character LCD screens that many other printers use, but that's not a problem if you don't mind looking at the manual once in a while.

The JX-9300's backup feature is helpful. It solves the specific problem caused by paper jams during long print jobs. With many laser printers, you would lose the page in memory during the reloading process. The Sharp's backup function prevents such a nuisance by holding the page contents in memory until it has successfully printed.

The JX-9300 works well, and it comes at a reasonable price. It's competing with a tough crowd. While the Sharp gives up a bit in font versatility and standard memory, it is a winner in its selection of printer emulations. Unfortunately, while multiple emulations make reviewers smile — and certainly expand the market for this printer — once you've purchased the JX-9300, you probably will use at most two emulations. That's when you'll want more fonts. Sharp does have a series of proprietary format font cards, but it would be nice to have a couple more fonts as a standard feature.

**B Brown**

## Dot-matrix printers

A dot-matrix printer is one of the simplest, most rugged, and most serviceable machines in the computer industry, and maybe in any industry. Most models are inexpensive, small, lightweight, and effective at their job. Even the expensive, large, and heavy ones are effective at their jobs, which are usually too demanding for the smaller models to handle. The automobile industry — and its customers — should be so lucky.

The basic printing mechanism of a matrix printer is simple. A printhead houses one or more vertical rows of tiny metal rods called pins, and each pin is carefully positioned in a tubelike track. The pins are spring-loaded and held back from the target ribbon and paper by electromagnets. When the charge is removed from a pin's electromagnet, the pin is released and the spring forces it into the ribbon, colouring a spot on the paper held against the printer's platen beneath the ribbon.

## NETCOMM MODEMS

|                     |       |
|---------------------|-------|
| Smart 2400 SA.....  | \$699 |
| Smart 123 SA.....   | \$599 |
| Smart 1234 SA.....  | \$780 |
| In Modem 123.....   | \$450 |
| In Modem 1234.....  | \$565 |
| In Modem 2400.....  | \$499 |
| Aut modem 123.....  | \$499 |
| Aut modem 1234..... | \$639 |

## DRIVES

|                                        |         |
|----------------------------------------|---------|
| Seagate 20MG with cont.....            | \$499   |
| Seagate 30MG with cont.....            | \$530   |
| Seagate 80MG V/Coil.....               | \$1395  |
| Miniscribe 42MB with cont.....         | \$650   |
| Miniscribe 30MB with cont.....         | \$559   |
| Miniscribe 71MB V/Coil.....            | \$1.159 |
| Miniscribe 30MB Hardcard.....          | \$750   |
| Chinon 360K drive.....                 | \$199   |
| Teac 1.2MB drive.....                  | \$249   |
| 720K floppydrive internal.....         | \$249   |
| 1.44Mb floppy drive internal.....      | \$350   |
| Tape backup sysgen internal units..... | Scall   |

## PRINTERS

|                              |               |
|------------------------------|---------------|
| <b>OKI LASER 1.5Mb.....</b>  | <b>\$3450</b> |
| ASI Postscript Laser.....    | \$7500        |
| Star NX-1000.....            | 450           |
| Star NX-1000 Color.....      | \$570         |
| Star NL-10.....              | call          |
| Star NX-15.....              | call          |
| Star NX 2410.....            | 780           |
| Star NB 2410 or 2415.....    | call          |
| Fujitsu DX2400.....          | \$970         |
| Fujitsu DL5600.....          | call          |
| Fujitsu DL3400.....          | Scall         |
| Fujitsu DL3300.....          | \$1090        |
| Fujitsu DL2400.....          | call          |
| Fujitsu DL2600.....          | call          |
| Citoh A10-30 Daisywheel..... | \$390         |
| Epson LQ500.....             | \$650         |

### IMAGINEERING ULTRA XT COMPUTER

This unit consists of:

MS-DOS 3.3  
GW BASIC  
640K RAM  
CLOCK CALENDAR  
SERIAL PORT  
PARALLEL PORT  
GAMES PORT  
TACTILE/LED KEYBOARD  
360K FLOPPY DRIVE  
4.77/10 MHZ CPU (8088-1)  
10 BLANK DISKS  
PUBLIC DOMAIN SOFTWARE

Configurations available include

- A: Dual diskdrives monochrome screen \$1679
- B: 20 MB harddisk monochrome screen \$1979
- C: 20 MB harddisk EGA screen \$2789
- D: 20 MB harddisk color screen \$2399
- E: 20MB harddisk mono & printer \$2379

FREE PUBLIC DOMAIN SOFTWARE THIS INCLUDES WORDPROCESSING, DATABASE, PROJECT MANAGEMENT, DESKTOP UTILITIES, DOS UTILITIES ETC.

## KOOKABURRA COMPUTERS

8 CURLEWIS STREET BONDI 2026

Telephone 365-0706 Facsimile 365-0366

Prices Include sales tax  
Free Hotline support and advice  
Stocks are currently available

## BOOKS

We carry a vast range of computer titles call for a catalog

## ADD ON CARDS

|                                               |              |
|-----------------------------------------------|--------------|
| Floppy controller 360K to 1.44Mb.....         | \$125        |
| Monographic Printer Card.....                 | \$119        |
| EGA Card 640x480.....                         | \$279        |
| Serial port.....                              | \$59         |
| Clock card.....                               | \$59         |
| Game port.....                                | \$60         |
| Serial/clock card.....                        | \$95         |
| Serial/clock/game/parallel card.....          | \$120        |
| Serial/clock/game/parallel & floppy cont..... | \$165        |
| Motherboard XT 10Mhz 0K ram.....              | \$220        |
| Motherboard AT 10Mhz OK ram.....              | \$670        |
| Ram Card.....                                 | \$85         |
| <b>Scanner &amp; software.400 dpi.....</b>    | <b>\$600</b> |
| Copyboard & software.....                     | \$250        |
| Wity Mouse.....                               | \$99         |
| Genius mouse and software.....                | \$150        |
| Hard Disk controllers.....                    | \$165        |
| Floppy & Harddisk Controller.....             | \$280        |
| Eprom programmer with 1 textool.....          | \$250        |
| Keyboard 84key.....                           | \$120        |
| Memory 256K chip (120ns).....                 | \$19-5       |
| Memory 256K chip (100ns).....                 | \$21         |
| Memory 256K chip (80ns).....                  | \$22         |
| Memory 1Mb chip (100ns).....                  | \$60         |
| <b>SPACEMATE WORKSTATION.....</b>             | <b>\$650</b> |
| Acoustic hoods.....                           | call         |

Call for a complete catalog on parts and accessories listing

## MONITORS

|                                        |       |
|----------------------------------------|-------|
| EGA monitor and card.....              | \$939 |
| IPL INTRA or ADI 14" mono monitor..... | \$249 |
| IBM or Intra 12" mono monitor.....     | \$199 |
| Multiscan monitor.....                 | Scall |

### IMAGINEERING ULTRA AT COMPUTER

This unit consists of:

MS-DOS 3.3  
GW BASIC  
1 MEGABYTE OF RAM  
CLOCK CALENDAR  
SERIAL PORT  
PARALLEL PORT  
GAMES PORT  
EXTENDED TACTILE KEYBOARD  
FDD/HDD CONTROLLER CARD  
1.2MB FLOPPY DRIVE  
6/10 MHZ CPU (80286-1)  
PUBLIC DOMAIN SOFTWARE

Configurations available include

- A: 40 MB harddisk monochrome screen \$3090
- B: 40 MB harddisk EGA screen \$3795
- C: 40MB hardisk VGA screen \$4350





# printers

top quality printers at rock bottom prices

• prices include Sales Tax

• Phone and mail order welcome

## brother

Leading the way in printer technology.

**BROTHER M-2518 \$1459**

136 col. 360 cps draft/75 NLQ, 18 pin, paper express, handles thick multipart forms, auto paper thickness adjustment, paper parking and colour printing, all-round work horse. At this price every office can afford one.

**BROTHER M-1709 \$799**

136 col. 240 cps draft/50 NLQ, friction and tractor feed, huge 24K buffer, auto paper load, paper parking, parallel and serial interface. Best value printer on the market today.

**BROTHER M-4018 \$2359**

136 col. 480 cps draft/100 NLQ, 18 pin, 96k buffer, selectable fonts, auto paper load, paper parking, dual interface and colour. Optional bottom feed. The heavy duty printer for volume users.

**BROTHER M-1724 \$1199**

136 col. 216 cps draft/72 LQ. 24 pin friction and tractor feed, advanced paper handling, features unique touch and print, outstanding text /graphics quality, dual interface. Save hundreds at this special price.

**BROTHER HL-8 LASER \$3999**

300 dpi, 8ppm, 1 megabyte RAM, 5 resident fonts. Bold, italic, portrait and landscape available for each font. Dual interface, 16 character display control panel. Best value 2nd generation laser available.

## Panasonic

Introducing a new range of printers from PANASONIC, a name synonymous with quality and reliability.

**NEW**

**PANASONIC KX-P1124 \$799**

11" wide, takes A4 sideways. 24 pin, 192 cps draft/63 LQ, 5 LQ fonts, paper parking, push/pull tractor and friction feed. Rear front and bottom paper path. Etc. Etc. Etc. This printer has everything!!

**PANASONIC KX-P1082 \$399**

80 col. 192 cps draft/38 NLQ, friction and tractor feed, print mode and font selector, exceptional quality. At this price nothing even comes close.

**PANASONIC KX-P1540 \$1159**

136 col. 240 cps draft/80 LQ, 24 pin friction and push tractor feed, paper parking, proportional space printing, dual interface, optional bottom feed. Excellent print quality in a high speed printer.

**PANASONIC KX-P1081/A \$469**

As KX-P1081 but APPLE IMAGEWRITER compatible, suitable for MAC, II GS. Unbeatable value.

**PANASONIC KX-P4450 LASER \$4999**

300 dpi, 11 ppm, 2xA4 paper cassettes, dual interface, 5 emulation modes, wide variety of fonts.

## Microsoft®

MS-Excel ..... \$729  
MS-Flight Simulator ..... \$79

MS-Mouse ..... \$219  
MS-Pageview ..... \$79  
MS-Project ..... \$599  
MS-QuickBasic ..... \$119

MS-QuickC ..... \$119  
MS-Windows ..... \$159  
MS-Word ..... \$649  
MS-Works ..... \$299  
MS-Multiplan ..... \$299

# printer wholesalers

12 Bramcote Street, West Chermside  
Brisbane, Queensland 4032

We accept Bankcard, MasterCard and Visa

**(07) 359 8516**

Pins are arranged in a single vertical row in 9-pin printheads; 24-pin models typically have three vertical rows of eight pins each, usually arranged in a staggered pattern. The basic pin action remains the same regardless of the number of pins in the printhead.

The printhead is mounted on a track so it can slide back and forth across the target paper surface. A character is formed on the paper by colouring an appropriate pattern of spots with a so-called 'character box' of horizontal and vertical spot positions in a rectangular, or matrix, pattern. The number of positions in the character box depends on the resolution of the printer. A graphic is formed by a free-form placement of spots on the paper.

As the printhead slides on its track along the paper, each pin required to form a vertical 'slice' of the character or graphic is 'fired' by releasing the electromagnet that holds it back from the ribbon. The computer inside the printer controls which pins are released, as well as where they are released during the printhead's trip across the track. Typically, character patterns are contained in ROM (read only memory) on the printer's system board, and they are read into memory and acted upon as the PC calls for each character. When a graphic is printed, the firing of the pins is controlled directly by the PC. In any event, enough coloured spots in the right places form the character or graphic of a dot-matrix printer.

## The quest for letter quality

Like display-screen engineers, printer engineers are constantly trying to squeeze more quality out of their display mechanism. All digital displays have inherently poorer quality than any continuous mechanism, such as a type ball or wheel with its fully formed characters. One approach to the quality issue is to design printers with higher dot resolution, or more dots per inch. That requires more pins in the printhead, but owing to their small diameter, 24 pins seems to be the maximum allowed by the metals available for making pins.

Another approach is to improve the character and graphics designs to use the available spots more effectively. Better use of the spots usually results in greater printer resolution without increasing the number of pins in the printhead. But a serious degradation in printer performance occurs because the printhead has to make extra trips across the same line to produce the high-resolution output.

At one time, 9-pin dot-matrix printers

were just not capable of letter quality printing. Early attempts at improving print quality gave them the ability to emphasise characters by printing extra dots vertically, horizontally, or both at once. That technique gave some resemblance of dark printing, but the results could hardly be called quality printing.

The first efforts to create serifed fonts for the 9-pinner were noble, but usually had laughable results. Better results were produced by very expensive, high-performance models such as Okidata's legendary Pacemark 2410, the Sherman tank of dot-matrix printing. But most company officers and managers wouldn't accept such output as letter quality printing.

That's all changed — in a big way. Virtually all 9-pin matrix printers offer 'near-letter-quality' fonts. Many of them are suitable for company correspondence, and home users should be more than satisfied with the results.

Print quality has never been much of a problem for 24-pin and 18-pin printers. From the start these machines were designed to go up against daisy wheel printers and take over the letter quality market, and they have succeeded quite well. Even so, manufacturers are constantly improving the breed's output and adding more compatibility modes, font cartridges, and ribbon options to make these printers more useful. And, better yet, the prices have been coming down.

## Successful evolution

Other important printer features have been re-thought and enhanced as well. Paper handling, once the bane of every printer user, has been re-designed to permit a peaceful coexistence among users, computers and printers. The newer designs let you load paper without ripping bunches of it into shreds, tearing much of your hair out, or needing a quick trip out of the office for a manicure repair. Changing forms is almost a pleasure.

That's because many of the new printers offer you the choice of loading paper from the front, back, or bottom. Some have an output tray that holds the printed paper away from paper still being fed in, which avoids the sort of ferocious paper jams that can occur with older systems. Others come with built-in stands that give you a place beneath the printer for input and output paper. And some printers load paper automatically. All you have to do is stick the end of your tractor-fed stack into a slot and press a button; the printer takes care of the rest.

The perforated continuous-form paper

so common with matrix printers is also the scourge of output quality. Even the highest-quality version of this ugly breed of paper will show telltale signs of its origins after you tear at the perforations to turn a continuously printed document into single sheets.

To avoid that problem, you can attach sheet-feeders to many of the new breed of matrix printers and stick a heap of company letterhead into the input bin. Some printer sheet-feeders have multiple bins so that distinctive second sheets and even envelopes can be fed in.

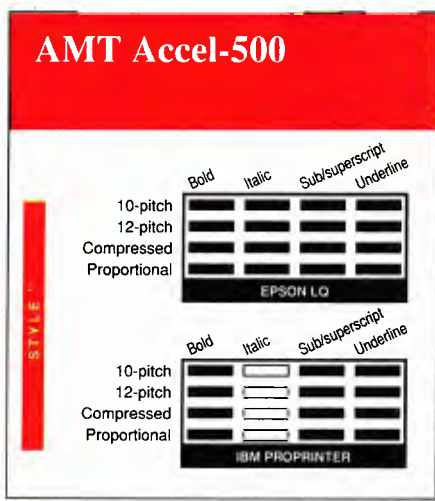
Dot-matrix printers are also quieter than before. The head and traveller mechanisms that move them are designed to run more smoothly, and they are constructed of better materials and assembled with greater emphasis on quality to enforce that design. Most printers that can't be made quiet by mechanical means are adequately sound-proofed.

Other advances in printer ergonomics include covers that are easy to lift off and that stay put when you replace them, custom-built stands for large and small-model printers, and a continuing trend toward easier-to-use operating panels and switches. And colour, which used to require special printers, is now just another feature needing only a special ribbon on a lot of relatively inexpensive printers.

## AMT Accel-500

The Accel-500 from AMT had so many interesting features in 17.5kg of grey plastic that it was a true letdown when I came across the quirks associated with it. In other words, I was impressed with this high-end, 24-pin dot-matrix printer — until it started printing.

One feature of the Accel-500 that will strike anyone familiar with dot-matrix printers is the intriguing control panel.





## Dot-matrix grid explanation

Within each chart is one grid to represent the printer's native mode and another to represent the printer's highest-quality emulation. If only one emulation is available with the printer, its characteristics are displayed in the native-mode grid.

Across the top of each grid are four of the most commonly used type enhancements: bold, italic, super/subscript and underline. Down the left side of the grid, the most commonly used styles are listed: 10 pitch, 12 pitch, compressed and proportional.

Note that pitches and point sizes are not interchangeable terms. Pitch is a measure of character width in a typewriter-style (monospace) font. For instance, 10 pitch means 10 characters per horizontal inch. A point is a vertical measure (roughly 1/72 of an inch); this comes into play in typesetting and in desktop publishing with laser printers.

To determine whether a particular enhancement is available in a given style or size, find their intersection within the grid. A blackened space indicates a positive answer.

AMT has taken the idea of printing out settings in the form of a menu and put it on the control panel as a 16-character LCD with a dial. Pressing the setup button and turning the dial makes print parameters appear on the LCD. You can scroll up or down through six major categories and their sub-heads: operations, print modes, page settings, tabs, communications settings and special modes.

Just turning the dial allows you to adjust the paper up and down, much the same way a platen knob does. Pressing Alt and then moving the dial lets you move the printhead left and right.

Additional control-panel buttons include font/pitch, mode/emulation, print/LPI, clear/reset, test/status, form feed, line feed, top of form, bail and paper park.

Primary modes are accessed by pressing the appropriate button, while the alternate modes are invoked when you press Alt and then the key.

No more turning the printer off and on

when you change the settings, either. If you decide to change an emulation, the change goes into effect immediately.

While most of us don't gripe about manually moving the paper bail, the printer's bail button allows you to do it from the control panel. The Accel-500 also features paper park, which backs up form-feed paper to the tractors if you need a quick memo on cut-sheet paper.

All of these nifty toys are fine until you

*'The AMT Accel-500 runs off of an IntelliCard — a device about the size of a playing card that slides into a slot in the back of the machine.'*

get to the printer's main function: printing. At \$2840, the Accel-500 offers one of the worst draft modes I've seen; letters chopped off, variations in print density and dots so widely spaced you'll wonder if you're really printing on a 24-pin printer. Near-letter and letter quality are better, but the print quality seemed chalky to me: fuzzy letters with edges that bleed into the page.

Text output is speedy, as you'd expect from a printer in this price range. Draft mode was clocked at 182 characters per second in narrow-carriage operation and 242cps when using a wide carriage. On the other hand, graphics output speed is slow. In Epson LQ emulation, the printer averaged 236 seconds on the graphics speed test; in IBM Proprinter emulation, 262 seconds.

A standard feature is a dual parallel/serial interface. Technically, if you are interested, you could hook up two com-

puters to this printer and write software code to switch between PCs. The Accel-500 is a rugged printer that could stand the strain of more than one user.

The printer runs off what the company calls an IntelliCard — a device about the size of a regular playing card that slides into a slot in the back of the machine. The IntelliCard contains the information required to run the printer. If you wish to add more fonts, you must purchase a second card for \$70 and \$25 per font (up to 12 fonts).

This printer is a paradox. It has enough print modes and fonts to qualify it for desktop publishing or sophisticated word processing, but the print quality is too poor to make it a contender yet. Perhaps the key word here is *yet*. AMT has done some interesting things with the Accel-500, but it obviously has a long way to go. If you need a printer right now that can function within a large office or group of users, and your primary printing needs include such things as spreadsheets, where print quality is not a crucial issue, the Accel-500 is a viable alternative. For anything else, the safest option is to wait and see.

**G Luchsinger**

## Epson DFX-5000

The Epson DFX-5000 is one of a new class of heavy-duty, extremely fast dot-matrix printers being marketed to companies that do extensive data processing. These machines are meant as an alternative to line printers — and, in this case, the alternative is a very good one.

Despite its size (it weighs in at a solid 28.7kg), the DFX-5000 is simple to set up and operate. All that weight contains a 9-pin printhead and an automated system that allows you to switch between two loaded tractor-feeds — one in front and one in back — at the touch of a button.

The front panel contains eight plastic

## At a glance

### AMT Accel-500

**Supplier:** Kenelec

**Tel:** (03) 560 1011

**Price:** \$2839

**Dimensions (HWD):** 18.5 by 60.9 by 45.7cm

**Weight:** 17.5kg

**Emulations:** Epson JX, LQ-2500; IBM Proprinter, 5182 Graphics Printer; Xerox 4020

**In short:** The Accel-500 is loaded with enough features to put the average dot-matrix printer to shame. However, print quality, especially in draft mode, does not nearly do justice to either the price or the 24-pin printhead.

## Epson DFX-5000

|                | Bold | Italic | Sub/superscript | Underline |
|----------------|------|--------|-----------------|-----------|
| 10-pitch       |      |        |                 |           |
| 12-pitch       |      |        |                 |           |
| Compressed     |      |        |                 |           |
| Proportional   |      |        |                 |           |
| EPSON FX       |      |        |                 |           |
|                | Bold | Italic | Sub/superscript | Underline |
| 10-pitch       |      |        |                 |           |
| 12-pitch       |      |        |                 |           |
| Compressed     |      |        |                 |           |
| Proportional   |      |        |                 |           |
| IBM PROPRINTER |      |        |                 |           |

# SIEMENS

## What's compatible with IBM, EPSON, normal paper and your ears?

### Siemens ink-jet printers.



Siemens PT88S/PT89S and PT90 ink-jet printers are fully compatible with your normal life.

If life is normally quiet, it will stay that way; if you wish to use normal paper, you can; and if you normally require compatibility with IBM-PC or EPSON, that's fine too.

You see, at Siemens we not only build in numerous peak-performance features, we also work hard to keep any problems out.

**Just look at the full range of benefits:**

- ☐ Whisper quiet ( $\leq 45$  dBA)
- ☐ High speed (200-340 cps)

- ☐ Near letter quality (up to 114 cps)
- ☐ Tractor and friction feed
- ☐ Inexpensive to operate
- ☐ Consistent graphics contrast

For more information, send the coupon to the Siemens office in your State or call us now for nearest dealer address.

**Dealer enquiries welcome.**

IBM is a registered trademark of International Business Machines Corp.  
EPSON is a registered trademark of EPSON America Inc.

#### Siemens Ltd.

Melbourne: 544 Church Street, Richmond 3121  
Phone: 420 7288  
Sydney: 383 Pacific Highway, Artarmon. NSW. 2064  
Phone: 436 8711  
Adelaide: 297 Pirie Street, S.A. 5000  
Phone: 236 0110  
Brisbane: 9 Parkview Street, Milton, QLD. 4066  
Phone: 369 9226  
Perth: 153 Burswood Road, Victoria Park. W.A. 6100  
Phone: 363 0130

#### Think ink-jet . . . think Siemens

Please send me more information on Siemens ink-jet printers.

Mr/Mrs/Ms: \_\_\_\_\_

Company: \_\_\_\_\_

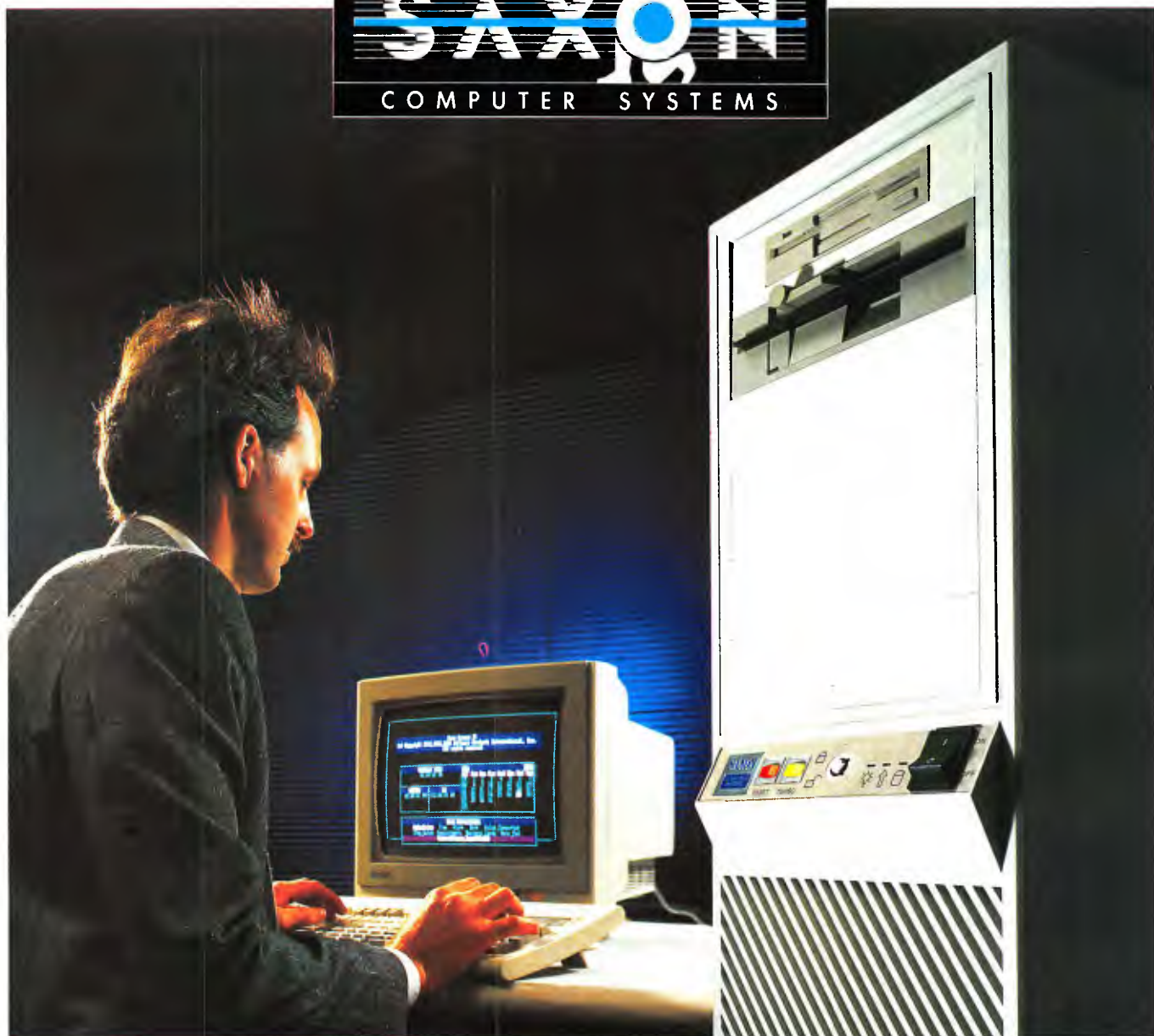
Address: \_\_\_\_\_

Tel: \_\_\_\_\_

CPSY 1227/0068SL

## High-tech from Siemens





## QUALITY RELIABILITY SERVICE

When you buy a personal computer system, you need quality and reliability, with features that will suit your needs.

But choosing the right system can be very difficult with so many different brands on the market.

Ask about Saxon Computer Systems. You'll find a superior range of up-to-date machines with all the features and all the quality you would expect.

Saxon Computer Systems are a product of Australian enterprise and Asian technology, a

unique blending of East and West.

Saxon Computer Systems offer a full range of IBM\* Compatible computers:

8088, 286 and 386 machines are available in Desktop, Tower case, compact and portable configurations.\*

The Wordwords - Canberra (062) 57 3788 Computer Brokers - Frankston (03) 781 4646  
Micropower - Ivanhoe (03) 497 3855 L & S Associates - Canberra (062) 47 2880  
\*Not all versions available in all configurations. \*IBM is a registered trademark.

*Call now for our free brochure*

Distributed in Australia by the PC Pty Ltd

Telephone enquiries (03) 859 5022 Fax: (03) 859 4152

Manufacturing Plant: P.O. Box 215 Nankang Taipei Taiwan

**THE EAST-WEST CONNECTION**

## PRINTERS

buttons, flush with the panel: on-line, form feed, line feed (load), tear off, micro feed forward and back, top of form, and paper select. The last-mentioned button, which lets you choose whether you want your paper to feed in from the front or rear tractor, also has a neat little graphic of the printer, with LCD arrows showing which tractor is presently in use. There are also power, ready and paper-out LCD indicators.

Both front and back tractor feeds will accept narrow or wide fanfold paper, and both are very simple to load. Once you have fastened the paper into the tractor feeds under the front panel or threaded it through a slot in the back, you simply close the door and hit the button. The printer pulls the paper in, checks the

### At a glance

**Epson DFX-5000**

**Supplier:** Epson

**Tel:** (02) 452 5222

**Price:** \$4788

**Dimensions (HWD):** 36.8 by 68.7 by 35.5cm

**Weight:** 28.7kg

**Emulations:** Epson FX

**In short:** A heavy-duty 9-pin printer that produces dot-matrix print at a very impressive speed and switches between two loaded paper tractors with a touch of a button. An excellent choice for a company that has heavy data processing needs.

width and prepares to print. Once you have both tractors loaded, all you have to do to change paper is simply hit the paper-select button; the printer takes about a minute to retract one type of paper and replace it with the other.

The DFX-5000 produces clear, rounded type in quality about as good as you're going to get from a 9-pin printer. The printer has a limited number of typefaces; it contains draft, proportional and two types of near-letter-quality fonts; roman (the default) and san serif. There is also SuperDraft mode, which is chosen through the DIP switches: it resembles the 'connect-the-dot' output produced by early dot-matrix printers, but speeds along at a sweet 363 characters per second. The normal draft type, which came in a bit slower at 307cps, was more readable.

One of the most impressive things about the printer is its thorough efficiency. Even the best of dot-matrix printers occasionally catches a paper in the platen or loads paper awkwardly. But the DFX-5000 changed from front to back

# Buying PC software or hardware?



If you haven't got a quote from The Computer Trader, you could well be either paying too much, buying grey market product or may not receive FULL AFTER SALES SUPPORT AND SERVICE.

*The price is always right*

## CALL US NOW

**MELBOURNE: (03) 417 7044**  
**SYDNEY : (02) 552 1755**

OR VISIT OUR SHOWROOMS TO CHECK US OUT:

Melbourne: 98 Hoddle Street, Abbotsford

Sydney: 261 Broadway.

- All product fully licensed • FREE 3 months Hotline support
- 30 day money-back guarantee • Full Computer Trader warranty • Manufacturer's warranty • Speedy delivery
- FREE introductory PC training courses.

Ask for FREE brochure on 4P, Australia's largest computer buying service.



## The Computer Trader

CT100R STOP



## PRINTERS

tractor feeds, loaded paper, automatically adjusted for the paper width, and found the top of form with a robotic competence that should make life a whole lot easier for its users.

The DFX-5000 is obviously meant for heavy office use. Its print quality is good but not great. This, together with its lack of facilities for cut-sheet paper, certainly does not recommend it for business letters. However, if you have a lot of data processing that you want printed efficiently and quickly, the DFX-5000 is a high-class buy.

**B Krasnoff**

### Hewlett-Packard DeskJet

The HP DeskJet, along with the Canon BJ-130, represents a new generation of inkjet technology. With resolution at 360 dots per inch and improved printing technology, the \$1995 DeskJet bears virtually no resemblance to its predecessor, the ThinkJet. Instead, the DeskJet is more akin to HP's excellent PaintJet.

One thing the DeskJet does not share with the PaintJet is conventional paper handling. With both the DeskJet and the Ruggedwriter, Hewlett-Packard has tried to distance the user from the paper handling (as if these machines were laser printers), but with mixed results. Don't try to figure out how the DeskJet moves paper; just trust that it didn't jam during the testing period. After loading a sheet from the 100-sheet input tray and printing, the DeskJet holds the page in two little arms that reach in from the sides of the output tray for three seconds while the ink dries. The little arms then retract and the page floats gently down into the output tray. It works, but there must be a simpler way.

The extra time added by the paper-handling mechanism drags print speeds down to 49 characters per second in near-letter-quality and 61cps in draft.

### Hewlett-Packard DeskJet

|                | Bold | Italic | Subsuperscript | Underline |
|----------------|------|--------|----------------|-----------|
| 10-pitch       |      |        |                |           |
| 12-pitch       |      |        |                |           |
| Compressed     |      |        |                |           |
| Proportional   |      |        |                |           |
| HP LASERJET    |      |        |                |           |
| 10-pitch       |      |        |                |           |
| 12-pitch       |      |        |                |           |
| Compressed     |      |        |                |           |
| Proportional   |      |        |                |           |
| Not applicable |      |        |                |           |



**and now:  
MAG STRIPE  
READERS &  
WRITERS!**

## BARCODE READERS

ASP's AUSTRALIAN designed and built BARCODE READER connects between the keyboard and an IBM PC/XT/AT or clone. When a barcode is scanned the PC is tricked into thinking the scanned characters have been typed on the PC keyboard. No more software hassles!

Including WAND/2000 \$649\*.

ASP also makes RS232 BARCODE READERS, LABEL SOFTWARE, OEM MODULES and ZIPCARD READERS.

**NEW PRODUCTS**

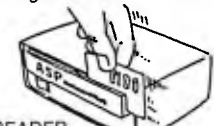
Our new range includes Barcode Readers

with 32K of battery backed RAM, and/or Clock, and/or LCD Display. They can operate standalone (data being downloaded at your convenience) or connected directly to a computer. They can even control solenoid door locks!

Uses include time clocking and costing, file tracking, security systems.

Our LOW COST PORTABLE BARCODE READER (battery operated) should be available by the time you read this. All designed here in Australia! Ring for prices and Barcode advice. Dealers/OEMs welcome.

**asp** (03) 500 0628  
microcomputers FAX: (03) 500 9461  
\* Retail Excluding Sales Tax



## PORTABLE BARCODE READER

ASP's AUSTRALIAN designed and built PORTABLE BARCODE READER lets you scan barcodes and type in numeric data ANYWHERE.

The reader is powered by built-in batteries, and uses a barcode wand or gun for input to the unit's large 32K RAM.

Security RAM back-up ensures your data is kept for up to 5 years, even with the unit turned off.

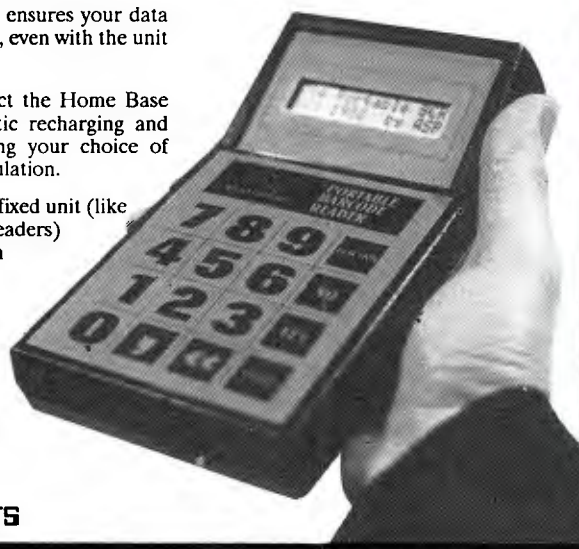
Back home just connect the Home Base (supplied) for automatic recharging and data downloading, using your choice of RS232 or keyboard emulation.

It can also be used as a fixed unit (like our standard barcode readers) saving the expense of an additional unit.

(03) 500 0628

FAX:  
(03) 500 9461

**asp**  
microcomputers



# Announcing the marriage of the telephone and computer...



**AutoDial - the  
leading edge in  
telephone communications**

## What is AutoDial?

AutoDial is an Australian developed hardware/software package that integrates records management with automatic telephone dialling.

1000's of businesses, big and small, can benefit from installing this package to their IBM® or compatible PC computer.

With AutoDial you have a cost effective record management and auto telephone dialling system. The dialer hardware can be used with other proprietary software programmes such as SIDEKICK\* that have the process of setting up a telephone number but no means to dial it unless you are using an expensive auto dial modem.

Autodial is a COMPLETE SYSTEM and utilises the following software programmes:

## AutoDial

This is the database portion of the system. AutoDial software accepts all details of your contacts. It can be used for telephone dialling and generating printed reports which are compiled as a result of comprehensive sort routines. Should you wish to mail these contacts, mailing address labels can be printed.

## PopDial

This is used as an express method of dialling telephone numbers when working with other software programmes. PopDial utilises TSR (Terminate Stay Resident) techniques.

## QuickDial

This allows you to 'grab' and dial telephone numbers from existing databases. The advantage of this system is that expensive rekeying is not required to obtain the benefits of automatic dialling. QuickDial utilises TSR techniques.

## Who benefits from AutoDial

- Salespeople
- Telemarketers
- Federal, State and Local government
- Management consultants
- Financial organisations
- Insurance organisations
- Purchasing officers

In fact 1000's of individuals and companies can benefit from AutoDial.

## AutoDial Ver: 1.03

Authorisation Number C88/4/184 (Telecom Australia)

### The Complete System.

Dialler and software package **\$399**

Software only - for use with existing modem systems **\$199**

Dialler only - for use with other proprietary systems, e.g. Sidekick\* **\$249**

Available from:



**SYDNEY**

Telephone: (02) 787 4255

Facsimile: (02) 787 3539

**CANBERRA**

Telephone: (062) 58 9138

For more information regarding your own or company requirements, please contact the numbers above or write to:

**Brylar Pty Ltd**

PO Box 297 Earlwood NSW 2206 OR

PO Box 1081 Belconnen ACT 2616

\* Registered trademark of Borland International



# PRINTERS

## At a glance

### Hewlett-Packard DeskJet

**Supplier:** Hewlett-Packard

**Tel:** (03) 895 2895

**Price:** \$1995

**Dimensions (HWD):** 20.3 by 44 by 37.6cm

**Weight:** 6.5kg

**Emulations:** HP LaserJet; Epson FX optional

**In short:** For small-scale desktop publishing applications or for sharp-looking memos and letters, the DeskJet does a good job, but its expensive maintenance costs may make a low-cost laser printer (perhaps the HP LaserJet Series II) a wiser buy in the long run.

Where the NLQ speed is good, the draft speed is disappointing. Since the two speeds are so close and NLQ looks so much better, you will probably use it most of the time.

Odd-sized paper up to 21.5cm wide can be hand-fed. With the manual-feed mechanism, it is difficult to feed a page in absolutely straight, and you can't use the old typist's trick of lining up the top and bottom of the page against each other because the end of the page is hidden deep inside the printer.

Text print quality is at least on a par with that of the best 24-pin dot-matrix printers, and any program that has HP LaserJet support should be graphics compatible with the DeskJet — a strong point in its favour. While print quality is impressive for a dot-matrix printer and remarkable for an ink jet, it is not a replacement for a laser printer in many applications, despite what HP says about the machine's capabilities.

Following the tradition of the all-in-one toner/drum used in the HP LaserJet, the DeskJet uses ink that comes in a small, disposable ink cartridge/printhead combination. The result is that the DeskJet is quite expensive to maintain, assuming steady office use; if you print fewer than 10 pages a day, the ink cost will be less of a factor.

For very small-scale desktop publishing applications or for test runs of output destined for a laser printer, the DeskJet does an excellent job. For office use, its smart-looking memos and letters may convince you to overlook its idiosyncrasies. But if you have heavy printing needs, consider the HP LaserJet Series II or another low-cost laser printer instead. It will cost about the same over time, and the output will be better overall.

**P Rose**

## Seikosha SBP-10AI

The Seikosha SBP-10AI is an impressive printer. It has a great variety of features designed to suit a number of business needs, and, at a back-breaking 33kg, its sturdy construction was obviously planned with heavy business use in mind. Its most impressive features are its speed — in draft mode, the SBP-10AI blazes along at a stunning 399 characters per second, which places it well ahead of anything else in its category — and its \$6533 price tag.

Like most sophisticated printers, the SBP-10AI is programmable. Its control panel, located at the top of the printer, contains an impressive display of membrane-button switches, some of which are numbered and most of which have at least two different tasks. Rather

*'The Seikosha SBP-10AI is obviously a workhorse, built to replace the heavy-duty line printers that many companies use with minicomputers and mainframes.'*

than using a single switch to toggle between, say, draft and near-letter-quality, you get a button for each menu choice. The buttons will change character width from 10 to 20 characters per inch, change type quality from draft to correspondence to NLQ, switch among up to three different fonts (which are accessed through removable cartridges), and change from fan fold paper to one of two cut-sheet bins.

To change one of the printer's settings, you hit a function switch and then key in

## At a glance

### Seikosha SBP-10AI

**Supplier:** Mitsui

**Tel:** (02) 451 7711

**Price:** \$6533

**Dimensions (HWD):** 127.3 by 66 by 65.3cm

**Weight:** 33kg

**Emulations:** Epson LQ; IBM Proprinter

**In short:** This large 18-pin dot-matrix printer produces good quality type at almost blinding speeds and is ideal for companies that need to produce a lot of quick spreadsheets.

the number of the feature category — a somewhat inconvenient process, since you must refer to the manual to find out which number to use. You can then toggle to your new choice, using two keys labelled Dec and Inc (Decrease and Increase). Once you've set up the printer to your liking, you can save the new configuration in what Seikosha calls a 'group'. You can create up to 10 groups with labels of 0 through 9; 0 is always the default and will come up with the printer.

The SBP-10AI feeds in paper in several different ways. It will pull fanfold paper from the front or from the bottom. It can also push the paper through from the back.

This enables the paper-parking feature, which lets you feed cut sheets into the printer without having to remove your fanfold paper. Cut sheets can be fed to the printer either automatically, using a bin that comes with the printer, or manually through a front slot that doubles as space for a bin.

The print quality of the printer is fine for an 18-pin printhead. The NLQ is clear and crisp, with only a bit of blurring on the r's to betray it as a dot-matrix printer. The correspondence quality, which is meant to be a halfway point between draft and NLQ, is adequate but rather jagged. I found the draft quality easier to read, although the dots were clearly visible.

The SBP-10AI is obviously a workhorse, built to replace the heavy-duty line printers that many companies use with minis and mainframes. Its incredible speed makes it a good machine for large firms whose needs cannot be filled by the present generation of laser printers. Whether that speed is worth around \$6500 is a good question that can be answered only by your accountant.

**B Krasnoff**



END



# Ventura 2

***The latest incarnation of the popular Ventura Publisher has some major new features in its two versions — basic and professional. Kathy Lang found much to praise but also a little to criticise.***

On the machines in the IBM PC family, the desktop publishing contest is primarily between two contenders — PageMaker and Ventura. Others, in particular GEM Desktop Publisher at the starter end and 3B2 in the professional market, are gradually establishing a hold, but the spotlights are firmly on the two market leaders. As tends to be the way in the software world, both products are enhanced significantly about once a year, but several months apart, so each leapfrogs the other in terms of features.

To make things harder for those trying to choose between them, the two approach desktop publishing from completely different angles. PageMaker was

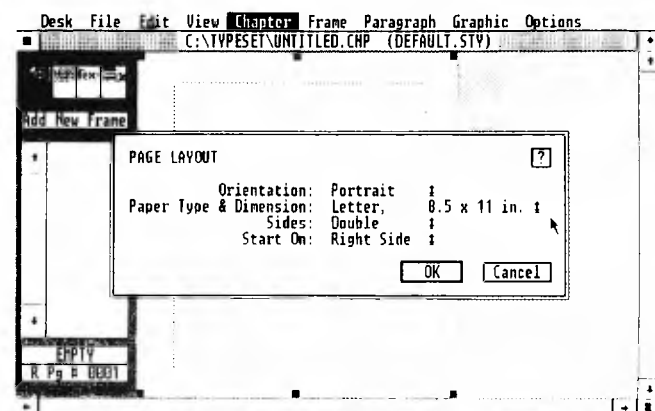
initially entirely a page make-up program, while Ventura has concentrated on handling complete documents including multi-file publications. Subsequent releases of both products have enhanced their original approach, and added new features which increased the area of overlap between the two.

In May, PageMaker 3 was finally released with a measure of document handling — text flow and text paragraph styles being the major feature in that area. Mid September, Rank Xerox announced version 2 of Ventura Publisher. What follows is based upon a beta test version of this product, but with only two

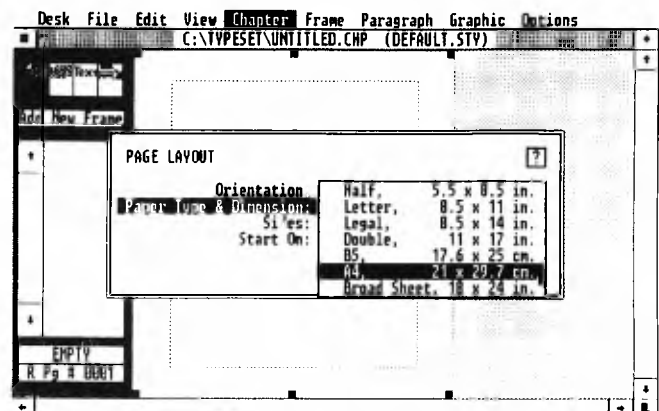
months to go everything except the (few) bugs, the text of the Help messages and the manual are said to conform to the final release.

Ventura 2 comes in three flavours. The single-user version of the base product is expected to retail at the same price as the current version; a networking version will also be available. In addition, there is a Professional Extension which needs EMS and provides major extra features plus the ability to handle much larger and more complex documents. Pricing details of this and the networked version are not yet available.

While not everyone has a detailed knowledge of Ventura 1.1, there must be

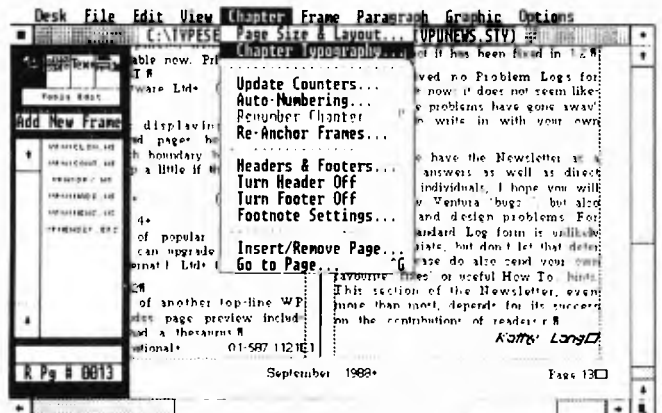
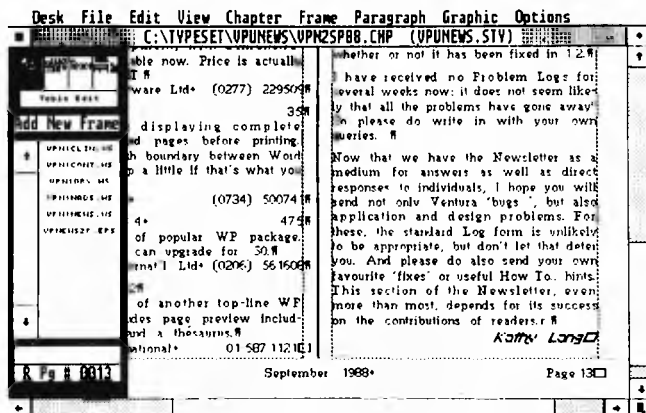


*New page layout menu, with scroll arrow*



*Click on an arrow and drag to the correct option, then release the mouse button to select it*





In version 1, proper alignment to top and bottom of columns was hard to achieve. Vertical justification (in the Professional Extension) makes light work of the problem. Here is the 'before' situation. The first step is to activate, from the Chapter ⇒

few people with an interest in desktop publishing who have not by now at least seen a demonstration of Ventura 1. So, in this review I shall concentrate on the major new features of Ventura 2, with comments on the way these enhance version 1.2.

## Editing features

Editing remains basically the same in Ventura 2. The major improvement for new users is that you can type text into the underlying page of a new chapter; instead of asking if you want to start a new text file and making you name it, Ventura 2 will just let you type and, when you save the chapter, name the text file with the same root name as the chapter file.

Other improvements concern conversion from word processors. Whatever your WP, Ventura will now, on request, automatically convert " pairs to proper start and end quotes, and double hyphens to an Em dash (no need to clutter up the text with <159>, <160> and <197> any more!), though to carp a little

I would have preferred automatic conversion to En rather than Em dashes, which are rather large for ordinary text. Ventura 2 allows you to add WP format conversion programs to the 'File Type' dialogue box, thus enabling suppliers of the less well-known WP packages to write their own converters for the more obscure file formats. This should be a significant boost to the availability of non-US products, particularly those meeting specialist needs. There are also some major improvements within Ventura for particular types of use — see under 'Maths and scientific text'.

## Typography and layout

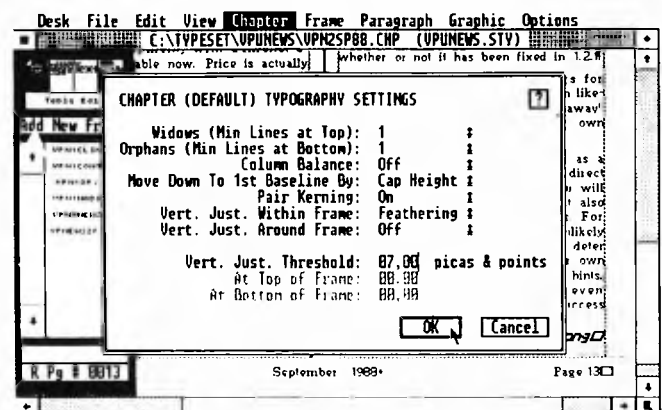
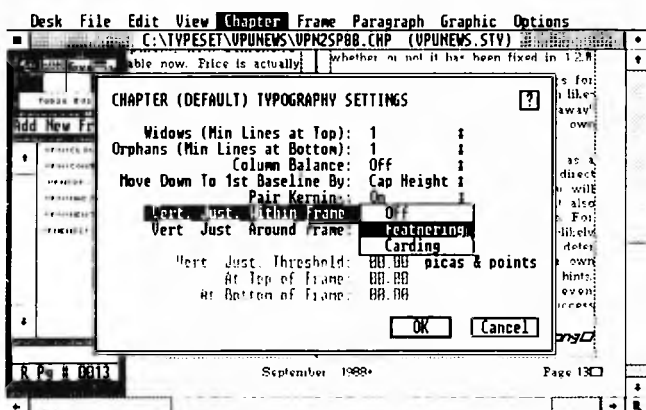
Ventura 1 gives a high degree of control over typography — including, for example, the ability to tighten inter-letter spacing for a tag in units of one-thousandth of an Em space — but often makes it hard to achieve the results which such control should permit. The best instance occurs in handling line spacing of multi-column pages, where, even if one sticks

to the basic rule of making all line spacing a multiple of that used for body text in order to ensure that columns line up at the bottom of the page, it is still possible to have slight irregularities in alignment across columns within the page.

One contributory cause is that Ventura 1 makes the distance between the baseline of the top line of text in a column equal to its ascender height, rather than to its line spacing. In Ventura 2, you can choose which approach to use. Another contributor to this problem is the rounding errors which, in Ventura 1, incorrectly produces non-integer line spacing; no longer shall we see the dreaded 10.98 point indicator when we really wanted 11 points.

These are but two examples of many changes, some small, others more extensive, which must have resulted from lengthy discussions with typesetters. Other improvements include:

- Enhancements to manual kerning which will speed it up.
- Faster incremental font changes when using a PostScript width table,



⇐ Typography menu, justification for the chapter. Justify using Carding (space is added in unit of body text line spacing, to ensure level lines across columns) or Feathering (space added where appropriate, according to the parameters specified for each) ⇒

## TOSHIBA LAPTOP PCs



Toshiba's wide range of powerful laptop PCs means there is one to suit every purpose. Sant Technology can advise you on the best laptop to suit your needs.

### Toshiba T5100

The most compact and affordable 386 laptop.

Now you can pick up 80386 power any time you want. Toshiba's revolutionary T5100 runs an 80386 processor with 2MB of RAM and a 40MB hard disk. Full EGA compatibility plus 640 x 400 bitmapped graphics. For desktop use you can even connect a full 101 key keyboard and an EGA or CGA colour monitor.

- 80386 running at 16 or 8MHz.

### Toshiba T3200 – the fastest PC/AT laptop.

The new Toshiba T3200 delivers sizzling AT performance and expansion capabilities.

- 12MHz processor. Co-processor option
- High contrast plasma screen
- 1MB RAM. 3MB RAM option
- Fast 40MB hard disk, 720K floppy

### Toshiba T1200 – Backlit LCD

High performance hard disk laptop PC runs on batteries.

- 20MB HD & 720K 3.5" drive (T1200HB) or 2 x 720K floppies (T1200FB)
- Superb super-twist backlit LCD screen
- Up to 6 hours on batteries
- Weighs only 5kg

## TOSHIBA PRINTER

### Toshiba P351SX



A three-in-one Dot Matrix Printer: one machine to suit all your printing needs: letter quality, draft quality, high density graphics

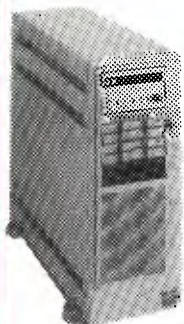
This is Toshiba's fastest dot matrix printer: Draft at 360 CPS; letter quality at 120 CPS

- Wide carriage
- Built in tractor
- Single sheet guide and friction feed
- 32K buffer
- Parallel/Serial interface standard
- Optional envelope sheet feeder
- Optional single & dual bin sheet feeders

# SANT TECHNOLOGY FOR YOUR BEST BUSINESS SOLUTION

## OLIVETTI PCs

### Olivetti M380/XP5



Second generation 386 computer with room to grow.

- 20MHz 80386 CPU
- 10 I/O slots
- Up to 5 integrated peripherals
- Hard disk capacity up to 600MB. Memory expansion to 64MB
- Runs MS-DOS 3.3, XENIX/386, UNIX V/386 and OS/2
- Supports WEITEK WTL 1167 co-processor
- VGA graphics support standard

### Olivetti M390/XP3 & M390/XP1

Compact 386 power.

- 20MHz 80386 CPU
- 7 I/O slots
- Storage up to 135 MB. Memory to 48MB
- VGA support standard
- Runs under MS-DOS 3.3, XENIX/386, UNIX/386 and OS/2.



### Olivetti M290

12MHz 286 power. Second generation features. The unique CPU board can be replaced easily as newer, more powerful processors are developed.

- 80286 processor runs at 12MHz
- Memory to 14MB. Storage to 100MB
- Runs MS-DOS 3.3, OS/2, XENIX.
- VGA, EGA and PGA video support

## TAPE BACKUP



### 60MB Tape Backup for Toshiba Laptops

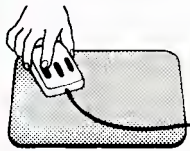
Now there is a fast and secure method of backing up the hard disks on your Toshiba laptops. With our 60MB tape backup a complete file oriented tape backup takes less than 10 minutes, with automatic verification and correction after backup.

# SANT TECHNOLOGY

1st floor, 440B Princes Highway,  
Rockdale, NSW 2216  
Phone (02) 597 2355  
Fax: (02) 597 7882  
Authorised dealer for Toshiba,  
Olivetti and Microsoft.  
Dealer enquiries welcome.  
Finance can be arranged

TUULIN





### MOUSE MAT

- A quality mouse mat for accurate and comfortable tracking
  - Anti-static
  - 265 x 225mm
- C21075 ..... \$9.95



### VERTICAL COMPUTER STAND

- FREE VALUABLE DESK SPACE OF YOUR PC BY PLACING IT ON ITS SIDE ON THE GROUND!
- Adjustable width from 115-188mm (4 1/4"-7 1/4")
  - Accommodates IBM® PC/XT/AT and most compatibles
  - Light weight, durable construction
- C21076 ..... \$24.95

## ROD IRVING ELECTRONICS

**SYDNEY:** 74 Parramatta Rd.  
Stanmore, 2048.  
Phone (02) 519 3134  
Fax (02) 516 3671

**MELBOURNE:** 48 A Beckett St.  
Phone (03) 663 6151

**NORTHCOLE:** 425 High St.  
Phone (03) 489 8866

**CLAYTON:** 56 Renver Rd.  
Phone (03) 543 7877

**MAIL ORDER & CORRESPONDENCE:**  
P.O. Box 620, CLAYTON 3168  
Order Hotline: 008 335757  
(Toll free, strictly orders only)  
Inquiries: (03) 543 7877  
Telex: AA 151938  
Fax: (03) 543 2648



### ORDER HOTLINE 008 335757 (TOLL FREE)

STRICTLY ORDERS ONLY

LOCAL ORDERS & INQUIRIES  
(03) 543 7877

### POSTAGE RATES:

|                |        |
|----------------|--------|
| \$1 - \$9.99   | \$2.00 |
| \$10 - \$24.99 | \$3.00 |
| \$25 - \$49.99 | \$4.00 |
| \$50 - \$99.99 | \$5.00 |
| \$100 plus     | \$7.50 |

The above postage rates are for basic postage only. Road Freight, bulky and fragile items will be charged at different rates.

All sales tax exempt orders and wholesale inquiries to:  
**RITRONICS WHOLESALE,**  
56 Renver Road, Clayton.  
Phone: (03) 543 2166 (3 lines)  
Fax: (03) 543 2648

Errors and omissions excepted.  
Prices and specifications subject to change.

IBM®, PC®, XT®, AT®, are registered trademarks of International Business Machines. Apple is a registered trademark. Denotes registered trademarks of their respective owners.



# MONITOR PRICE BREAK-THROUGH!



**GOLDSTAR 20MHz COMPOSITE MONITOR**  
X14514 GREEN only \$89  
X14516 AMBER only \$89  
10 OR MORE \$85 EACH



**RITRON CGA COLOUR MONITOR**  
Quality monitors without the exorbitant price tag!  
Display Tube: 14 inch 90° deflection 0.39mm Dots trio pitch.  
Dark face screen  
Phosphor: P22  
Resolution: 640 dots (horizontal) 240 line (vertical)  
X ..... only \$495



**RITRON VGA COLOUR MONITOR**  
Quality monitors without the exorbitant price tag!  
Display Tube: 14 inch 90° deflection P22 Non-flare, tint. 0.31mm Dot pitch.  
Active Display Area: 245 x 185mm  
Resolution: 800 dots(H) x 600 lines(V)  
Display Colour: TTL input  
TTL input: 8/16/64 colours  
Analog input: unlimited colours  
X ..... only \$995



**RITRON 2 MONITORS**  
Stylish 20MHz monitors available in green or amber displays and with built-in swivel and tilt base.  
**SPECIFICATIONS:**  
CRT Display Size: 12 inches non-glare 90 degree deflection.  
Input Signal: 1.0 - 2.5V p-p composite video signal.  
Input Impedance: Normal 75 ohm, high approximately 50K ohm.  
Input Terminals: RCA phone jack.  
Rise and Fall Time: Less than 25 us  
Video Bandwidth: 20MHz  
Corner: 800 lines  
Geometric distortion: 2% or less  
Linearity: less than 2%  
**Controls:**  
Front: Power On/Off, brightness, contrast. Rear: Vertical hold, Horizontal hold, Vertical line, Vertical size.  
Green Cat.X14506 ..... \$179  
Amber Cat.X14508 ..... \$179  
**ONLY \$119**



**RITRON EGA COLOUR MONITOR**  
Quality monitors without the exorbitant price tag!  
Display Tube: 14 inch 90° deflection dot type black matrix. Standard persistence phosphor  
Active Display Area: 240 x 180mm  
Resolution: 64 Colour: 720 dots(H) x 350 lines 16 Colour: 640 dots(H) x 200 lines  
X ..... only \$695



**PRINTER LEAD**  
• Suits IBM® PC/XT, compatibles  
• 25 pin "D" plug (computer end) to Centronics 36 pin plug  
P19029 (1.8 metres) \$14.95  
P19030 (3 metres) \$19.95



**WITTY MOUSE**  
• Three buttons, user definable. Get the maximum selective features possible by having a third button choice.  
• A specially silicone coated steel ball transfers mouse movement to internal motion encoders without the need of a special surface. Smooth gliding over any hard, even surface.  
• High resolution movement of 195 dots/inch. This means you can work with a smaller table space with less hand movement than a lower resolution mouse.  
• Optical rotary encoder  
• Max. tracking speed: 200m/sec  
• Mouse resident firmware  
• Auto repeat key  
• 1.5 metre lead  
• DB25 socket connector  
• Weight: 212 grams  
• Size: 116 x 66 x 34mm  
• Mouse Driver Software included, allowing you to install with all popular software packages. Also included is the handy Pop-Up menu software that allows the user to integrate the mouse with the keyboard, DOS, and other popular software packages including D-Base, Framework, Lotus, Symphony, Wordstar and others.  
Cat.X19950 ..... \$59.00



**TELECOMMUNICATIONS AUSTRALIAN STYLE ADAPTOR CABLE**  
• Australian socket to plug/socket  
• Length 10 metres  
Cat.Y16015 ..... \$14.95



**APPLE® COMPATIBLE SLIMLINE DISK DRIVE**  
Compatible with Apple 2+  
Cat. X19901 ..... Only \$179

**APPLE® IIC COMPATIBLE DISK DRIVE**  
(including cable ..... only \$199  
(\*Apple is a registered trade mark)



### CPF CONTINUOUS POWER FILTER (SPIKE ARRESTOR)

The Fortron CPF Filtered Electronic Spike Protector provides a protective electronic barrier for microcomputers, printers, telephone systems and modems electronic typewriters, audio and stereo systems and other sensitive electronic equipment.

The CPF provides protection from dangerous electrical spikes that can cause anything from obvious damage (like immediate equipment failure) to less obvious harm that can drastically shorten a system's life. CPF's superior circuitry design and semi conductor technology responds instantly to any potentially damaging over-voltage, ensuring safe trouble free operation.

Additionally, CPF's filtering capability helps eliminate troublesome and annoying interference, general hash created by small motors, fluorescent lamps, and the like that threaten the performance and shorten equipment life of unprotected electronic components.

**SPECIFICATIONS:**  
Electrical rating: 220-260 volts (AC) 50Hz 10 Amp  
Spike/RFI Protection: 4,500A for 20m/second pulses.  
Max clamping voltage: 275V differential mode.  
Cat.X10088 ..... \$69.95



**DIRECT IMPORT 5 1/4" DISK DRIVE!**  
Double sided, double density, 500K unformatted, 360K formatted. Direct import price ..... Only \$139



**RS232 GENDER CHANGERS**  
• Saves modifying or replacing non-mating RS232 cables.  
• All 25 pins wired straight through  
Cat.X15650 Male to Male  
Cat.X15651 Male to Female  
Cat.X15652 Female to Female  
Normally \$14.95 each  
Only \$9.95<sup>ea</sup>



**MITSUBISHI 5 1/4" DRIVE 4851/MF501**  
Slimline 5 1/4" disk drive, double sided, double density. 500K unformatted, 360K formatted. 40 track/side. Steel band drive system.  
Cat. C11901 ..... \$239

**MITSUBISHI 5 1/4" DRIVE 4854/MF504**  
Slimline 5 1/4" disk drive, double sided, high density, 1-6MB unformatted, 1-2MB formatted.  
Cat. C11904 ..... \$279

**MITSUBISHI 3 1/2" DRIVE MF353C**  
Double sided, double density, 1MB unformatted, 720K formatted.  
C11908 ..... \$239  
C11909 incl 5 1/4" mount bracket \$269

**MITSUBISHI 3 1/2" DRIVE MF355**  
1-6 M unformatted, 1.44M formatted.  
C11910 ..... \$269  
C11911 incl 5 1/4" mount bracket \$299

**5 1/4" MOUNTING BRACKET KIT FOR 3 1/2" DRIVE**  
X11050 ..... \$29



**DELUXE JOYSTICK**  
Deluxe micro switch controlled joystick with standard 9 pin connector.  
• Dual firing buttons contoured for quick response  
• Lightweight design for maximum comfort and playing time  
• Handle is contoured to match your hand  
• Stabilising suction feet  
• Suitable for Atari® 400/800 computers, Commodore® VIC 20/64, Amstrad® CPC464, Sears® games and SV318/328 computers.  
C14217 ..... \$34.95





### COMPUTER FANS

Why tolerate noisy computer fans when you can replace it with a quality new fan at these prices?

240V 4 5/8" Cat. T12461 **\$14.95**  
115V 4 5/8" Cat. T12463 **\$14.95**  
240V 3 1/2" Cat. T12465 **\$14.95**  
115V 3 1/2" Cat. T12467 **\$14.95**  
**10+ fans (mixed) only \$10 each!**

**FAN GUARDS TO SUIT**  
4 5/8" Cat. T12471 ..... **\$3.95**  
3 1/2" Cat. T12475 ..... **\$3.95**



### PRINTER RIBBONS TO SUIT:

CP80, SX80, DP80, BX100  
**MB100**  
1-9 (C22036) 10+  
**\$8.95 \$7.95**

MX70/80 FX70/80 RX70/80  
1-9 (C22031) 10+  
**\$8.95 \$7.95**

MX100, FX100, RX100  
1-9 (C22002) 10+  
**\$19.95 \$18.95**

**LX80**  
1-9 (C22003) 10+  
**\$9.95 \$8.95**

**LQ1000**  
1-9 (C22012) 10+  
**\$27.60 \$25.00**



### DISK NOTCHER

Converts 5 1/4" single sided floppy disks to double sided by placing an appropriate notch in the floppy disk jacket.

C21070 ..... **\$9.95**



### SCHMIDT 123AT MULTI STANDARD MODEM

- V21, V22, V23 Multi standard modem: 1200/300, 1200/1200, 1200/75)
  - Auto dial "AT" command set (Hayes) compatible)
  - Auto answer/auto disconnect
  - Auto answerback (Similar to Telex)
  - Auto or manual control
  - Dial-up or leased line operation
  - Pulse or Tone Dialing
  - Automatic speed ranging
  - Speaker for call progress monitoring
  - Baud-rate converter with 48 character buffer (V23)
  - Synchronous or asynchronous operation
  - Fully self contained power supply
  - Low power operation
  - Metal case (R.F. shielded)
  - Visual monitoring of important interface circuits (7 LED's)
  - Full or half duplex (V23)
  - Double adaptor plug to allow use of standard phone (Mode 1/3/5)
  - Telecom Authorised (C87/3/65)
- ..... **\$549**

\*Hayes is a trademark of Hayes Microcomputer Products Inc



### STAR NX1000 PRINTER

- 144 c.p.s. high speed draft printing
  - 36 c.p.s. NLQ printing
  - 8 built-in NLQ fonts
  - Proportional printing available in all font styles
  - Convenient push button control panel
  - Paper parking mechanism
  - Tractor and friction feeds standard
  - Standard parallel interface
  - Two emulation modes: IBM Proprietary II, EPSON ESC/P
- C22049 ..... **\$495**



### 3 1/2" DISK STORAGE (DD80-L)

- Holds up to 80 x 3 1/2" diskettes.
  - Smoked plastic hinged lid
  - Lockable (2 keys supplied)
  - High impact plastic base
  - Contemporary design
- C16038 ..... **only \$19.95**

### 3 1/2" DISK STORAGE

- Holds up to 40 x 3 1/2" diskettes.
  - Lockable (2 keys supplied)
  - High impact plastic lid and base
- C16035 ..... **only \$14.95**

## NOW OPEN IN SYDNEY!

74 PARRAMATTA RD, STANMORE  
PHONE (02) 519 3134



### PANASONIC KX-P1081 DOT MATRIX PRINTER

- 120 C P S
  - Pica or Elite character set
  - Print Modes: NLQ, Dot Graphics, Draft, Proportional Font.
  - Reliable and Compact
  - Proportional Printing
  - Logic Seeking
  - 1K Printer Buffer
- C20035 . Normally \$595  
We won't be beaten! **only \$379**



### PRINTER STANDS

- Restores order to your work area.
  - Conveniently stacks paper printout in document tray automatically
  - Made of black plastic coated steel
  - Suitable for most printers (80/132 column)
  - Excellent value at these prices!
- C21054 ..... **\$26.95**



### DATA TRANSFER SWITCHES

- If you have two or four compatible devices that need to share a third or fifth, then these inexpensive data transfer switches will save you the time and hassle of constantly changing cables and leads around.
- No power required
  - Speed and code transparent
  - Two/Four position rotary switch on front panel
  - Three/Five interface connections on rear panel
  - Switch comes standard with female connector

2 WAY RS232C X19120 ..... **\$49**  
4 WAY RS232C X19125 ..... **\$59**  
2 WAY Centronics X19130 ..... **\$49**  
4 WAY Centronics X19135 ..... **\$59**



### JUMBO 5 1/4" DISK STORAGE (DD120-L)

If you have lots of disks, you'll appreciate the extra capacity of this disk storage unit when it comes to locating a particular disk.

- Features...**
- 120 x 5 1/4" disk capacity
  - Smoked plastic hinged lid
  - Lockable (2 keys supplied)
  - High impact plastic base
- C16028 ..... **only \$19.95**

### 5 1/4" DISK STORAGE (DD100-L)

Efficient and practical. Protect your disks from being damaged or lost!

- Features...**
- 100 x 5 1/4" disk capacity
  - Smoked plastic hinged lid
  - Lockable (2 keys supplied)
  - High impact ABS plastic base.
  - Contemporary design
- C16020 ..... **only \$15.95**



### COPY HOLDER (YU-H32)

- Adjustable arms allows easy positioning.
  - Copy area 9 1/2" x 11"
  - Sliding line guide
  - Clamp mounting
- C21062 ..... **\$39.95**



## "NO BRAND" DISKS!

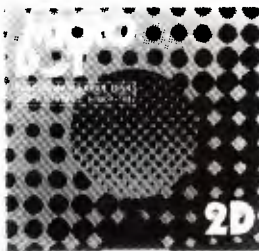
Now you can buy absolute top quality disks that are also the cheapest in Australia! They even come with a lifetime warranty, which indicates the quality of these disks. So why pay 2-3 times the price for the same quality?

Packs of 10, D/S D/D without boxes, or brand name, just their white paper jacket, and index labels. (5 1/4" disks includes write protects).

**5 1/4" 2S/2D "NO BRAND" DISKS**  
10+ DISKS 100+ DISKS 1,000+ DISKS  
**\$6.75<sup>ea</sup> \$6.50<sup>ea</sup> \$6.25<sup>ea</sup>**  
(ALL PRICES PER 10 DISKS. TAX EXEMPT PRICES LESS \$1)

**5 1/4" HIGH DENSITY DISKS (DOUBLE SIDED)**  
10+ DISKS 100+ DISKS 1,000+ DISKS  
**\$23.95<sup>ea</sup> \$22.95<sup>ea</sup> \$21.95<sup>ea</sup>**  
(ALL PRICES PER 10 DISKS. TAX EXEMPT PRICES LESS \$1)

**3 1/2" 2S/2D "NO BRAND" DISKS**  
10+ DISKS 100+ DISKS 1,000+ DISKS  
**\$23 \$22 \$21**  
(ALL PRICES PER 10 DISKS. TAX EXEMPT PRICES LESS \$2)



## MICRODOT DISKS!

FREE PLASTIC LIBRARY CASE WITH EVERY 10 DISKS!

| DESCRIPTION  | 1-9 BOXES     | 10+ BOXES      |
|--------------|---------------|----------------|
| 3 1/2" 2S/2D | ..... \$32.95 | <b>\$30.95</b> |
| 5 1/4" 1S/2D | ..... \$ 9.95 | <b>\$ 9.50</b> |
| 5 1/4" 2S/2D | ..... \$11.95 | <b>\$10.95</b> |
| 5 1/4" 2S/HD | ..... \$23.95 | <b>\$22.95</b> |



## VERBATIM DISKS!

(ALL PRICES PER BOX OF 10 DISKS)

| DESCRIPTION  | 1-9 BOXES   | 10+ BOXES      |
|--------------|-------------|----------------|
| 3 1/2" 1S/2D | ... \$39.95 | <b>\$37.95</b> |
| 3 1/2" 2S/2D | ... \$46.95 | <b>\$43.95</b> |
| 3 1/2" 2S/HD | ... \$99.00 | <b>\$89.00</b> |
| 5 1/4" 1S/2D | ... \$22.00 | <b>\$21.00</b> |
| 5 1/4" 2S/2D | ... \$26.00 | <b>\$24.00</b> |
| 5 1/4" 2S/4D | ... \$75.00 | <b>\$70.00</b> |
| 5 1/4" 2S/HD | ... \$41.00 | <b>\$39.00</b> |

# ROD IRVING ELECTRONICS



Clean

BIG HITS

Crisp

HARDWARE

Simple

Scrawl Quick

Heavy

Classic

Α Ε Φ Π Θ Ρ Ο

Casual

**FONT-MAKER**

tique

Spring

rent

Readable

Pleasant

Antique

Invited

Outline

SHOW Loose

**FONT MAKER** creates bit mapped fonts from outline fonts, in any size, width, angle, mirror, even reversed, for HP and compatible Laser Printers.

While Bitmap fonts are only available in limited sizes, all of the typefaces in the Digi-Font range are scalable, meaning that they can be used in a very wide range of sizes, from 3.0 point up to 720 point, in tenth of a point increments. (limits depend upon computer and printer limitations.) And since you can create fonts with partial character sets, you can create a special headline font in an enormous size without the normal memory limitations.

Unlike Bitmap fonts, Digi-Fonts may be manipulated in a variety of ways to create special fonts. With Font Maker you can create

fonts which are wider, narrower, slanted, rotated, mirrored, and/or reversed, in both portrait and landscape orientations.

Font Maker with 8 fonts is only \$120.

The complete Digi-Font Typeface Library with 258 fonts is \$700. (That's less than \$3 per font!)

If you would like further information and sample sheets, simply attach your business card to a copy of this advertisement and send it to Software Express.

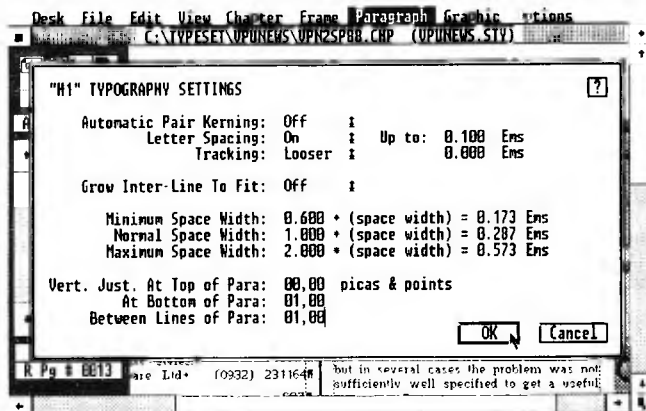
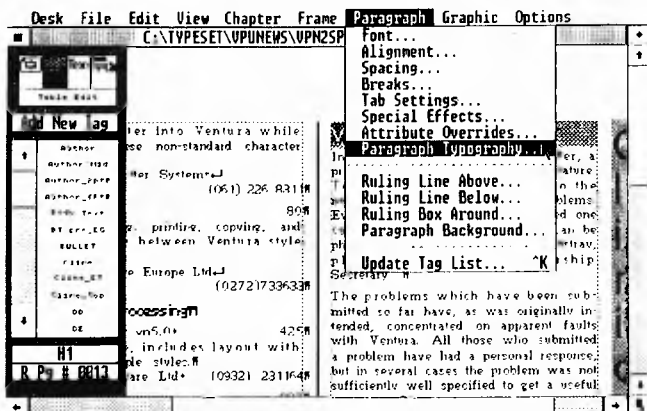


**SOFTWARE**  
*Express*

AUSTRALIAN DISTRIBUTOR OF DIGI-FONTS & FONT MAKER

SYDNEY: 74 PARRAMATTA RD, STANMORE, 2048. PHONE (02) 519 3249. FAX (02) 516 3671  
MELBOURNE: 48 A BECKETT ST, MELBOURNE, 3000. PHONE (03) 663 6580. FAX (03) 663 6117

# SCREENTEST



← paragraph tag and for graphic frames). Next, define the maximum extra space to be added for each tag, from the Paragraph Typography menu. Justify by adding space above, below or between paragraphs, just as mandatory paragraph spacing can →

which goes some way to making up for the lack of true copy-fitting within a line.

- Kerning tables for LaserJet printers (as well as PostScript devices, which were in Ventura 1).
- Preventing hyphenation of compound words where appropriate.
- Half-point increments for PostScript fonts.
- Text rotation in units of 90 degrees, provided your printer can cope (LaserJets and others which use PCL as their control language do not allow a change of orientation within a page.) You can also specify the vertical space which the rotated text should occupy.
- Position and size control over sub and super-scripts and small caps.
- Automatic increases in line spacing when any part of a line contains a larger point size: this was required for equation setting, and has uses in ordinary text, too. In Ventura 1, such automatic adjustment occurred only when resetting the font size through a tag, not when making the change through Set Font in the Text

mode, so it was possible for text made larger in that way to overlap preceding or following lines.

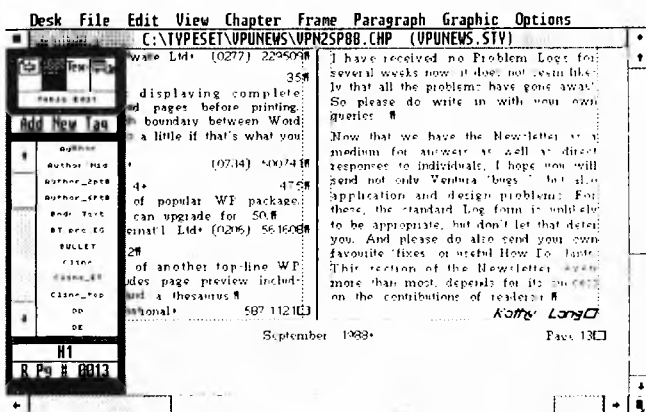
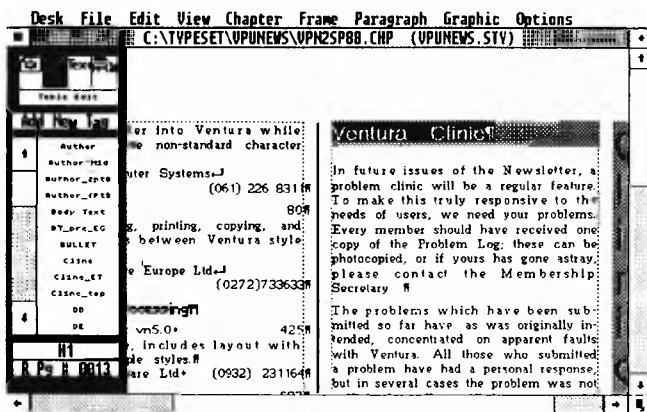
- For PostScript users, the ability to produce grey scale and outline fonts.

These improvements are all included in the base version of Ventura 2. But, while they provide a solution to the column-balance problem which will satisfy those who are content to have all line spacing in units of that for body text, the solution is, to my mind, too narrow. For a better solution which actually buys the reader something, you will need the Professional Extension. To elaborate: virtually all reading research shows that people find it easier to read text with reasonably open line spacing, and with more white space between paragraphs than within them.

But if you look at the way pages like those in this magazine, any comparable publication in any field, newspapers, even most books, you will find very few that allow any extra space between paragraphs; most just nod in the direc-

tion of paragraph identification by indenting the first line a little. The reason is that, to balance the text in columns and on facing pages, the 'keep all line spacing a multiple of body text spacing' constraint permits either no space between paragraphs, or a full blank line, which looks odd in printed text and covers significantly more space. On current systems, the only way cranks like me (who believe that in any layout design the needs of the reader should be paramount) could do a proper job was to use 1.5 line spacing between paragraphs, and insert half-line blank frames to even up the columns when necessary.

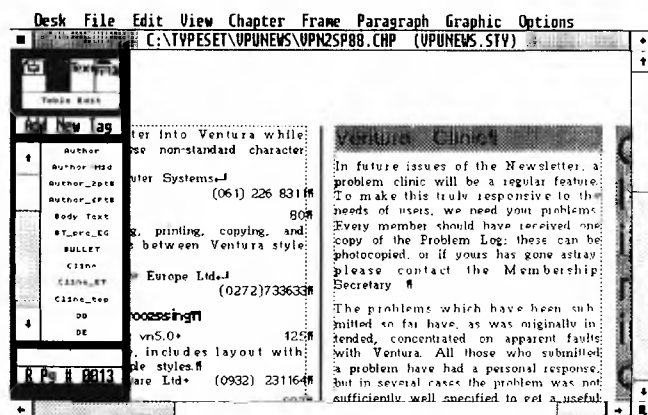
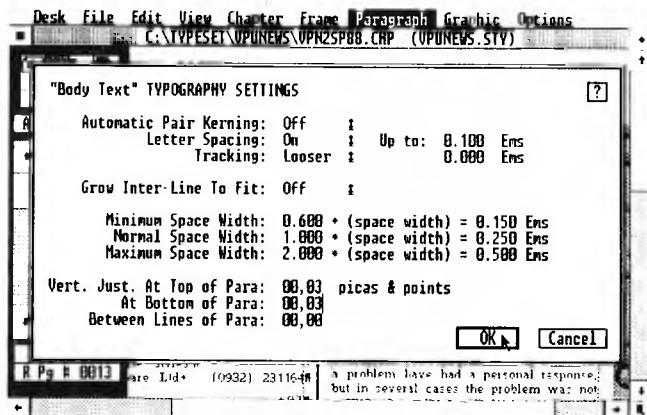
There is, however, a pukka alternative, which achieves both the aims of readability and the standards required by the typographers: vertical justification. Very few of even the most powerful page-setting systems have this capability. In the extended version of Ventura 2, vertical justification is provided in two forms. The 'carding' op-



← be added in the same places in the 'Spacing' option. The example here allows extra space around the heading tag, but no vertical justification space has been specified for any other tag in this column. The effect at the top of the column — a lot of white space. And at the bottom — correctly aligned →



# SCREENTEST



← To correct the large amount of white space at the top, small adjustments are to be made to body text parameters. The result is more pleasing for the top of the column, while the bottom remains correctly aligned

tion simply adds extra spacing in units of body text line spacing, thus providing better control and faster layout of pages using the convention already mentioned. The advantage is that even in pages which fall short — because perhaps of widow or orphan prevention — columns will always line up across the page.

The alternative, allowing the flexibility over line spacing which I prefer, is 'feathering'. This adds space in increments small enough to force vertical justification whatever the various units of line spacing and frame size used in the page; columns will then line up correctly at the bottom, but will not necessarily match within the page. Controls are provided to allow you to specify how much space may be added and where, differentiating between frames (as a class or as individual frames), tables (in the same way) and text, with control being part of the tagging mechanism, allowing you, for example, to permit extra space associated with

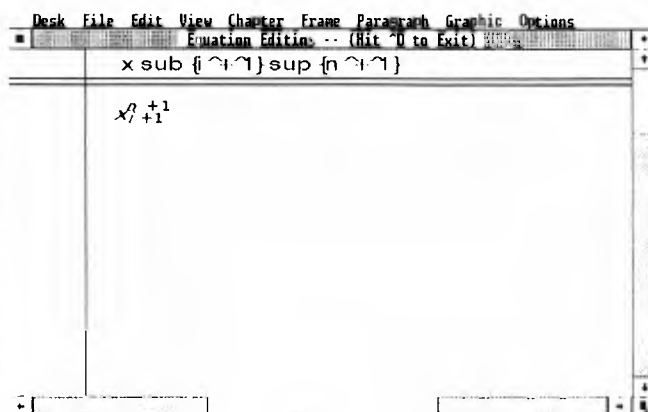
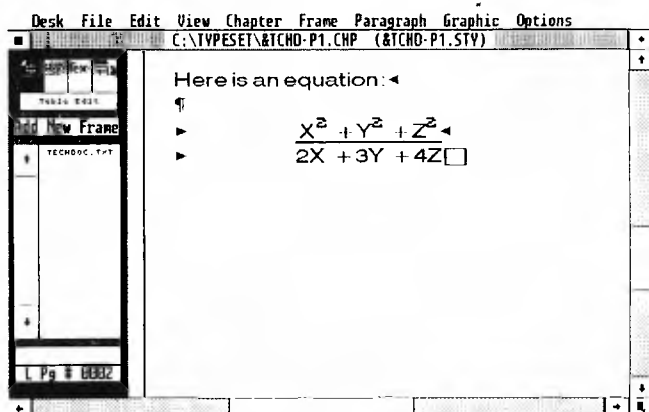
headings, but little or none with body text paragraphs.

## Publication layout

Ventura 1's automatic pagination features were already the best available on a package released in Australia, so the room for improvement was limited. At the top of my wish-list was the ability to co-ordinate page numbers across chapters — in Ventura 1 you had to enter the correct starting number for each chapter manually. Ventura 2 allows you to choose 'Previous Number +1' as the starting number; the correct numbers are not shown on the screen, but appear correctly during printing if you load the publication file in multi-chapter options, and print from there. Corresponding features work as you would expect for chapter, figure and table numbering, but not for 'floating' footnotes — these can still only be numbered either within a page or within a chapter.

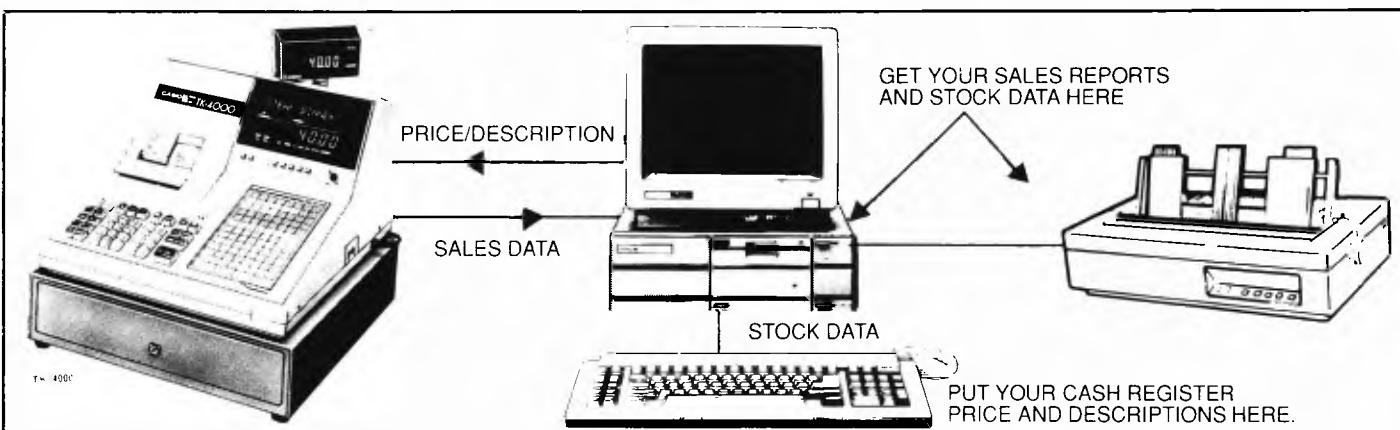
Another improvement on page numbering allows you to place page and chapter numbers anywhere on the page, rather than just in headers and footers. A customer of mine has a magazine design in which the page number sits outside a vertical rule running the full height of the page; because of the way text had to be aligned, in Ventura 1 the only way to handle this was to enter each page number manually. In that particular application this did not present an impossible overhead, but often it would, and the new feature will solve the problem.

Ventura 2 now provides a tag attribute to specify vertical alignment within page, frame or box text; this provides a feature corresponding to paragraph alignment within the horizontal dimension. I shall seize upon this feature gladly to get the destination address correctly positioned when typing letters destined for window envelopes. My letterhead is too deep to allow the recipient's address to be



Equations can be set easily, again in the Professional Extension. Equations can be included anywhere in the text, while in Text mode. To enter an equation, choose the 'Insert Special Item' option on the Edit menu. Equation entry and editing takes place in a superimposed editing window; above the line shows what the user types, while the part below shows Ventura 2's interpretation

# **INTRODUCING** **A** **FULLY INTEGRATED POINT OF SALE** **SYSTEM** **AT AN AFFORDABLE PRICE.**



## **FULL SYSTEM INCLUDES**

- **CASIO ELECTRONIC CASH REGISTER**
- **XT OR AT COMPATIBLE COMPUTER**
- **PRINTER**
- **INTEGRATED ACCOUNTING PACKAGE (INC. DEBTORS/ CREDITORS/STOCK/GENERAL LEDGER)**
- **COMMUNICATIONS SOFTWARE**

## **FEATURES:**

1. Avoid Double Input
2. Stock items, including price & description automatically downloaded to electronic cash register
3. Upload Cash Sales into Accounting Package, decrementing stock and updating General Ledger accounts with sales
4. Keep accurate daily Stock Records
5. Full Stock Reporting and Sales Analysis

**DEALER ENQUIRIES WELCOME  
DEALER TRAINING PROVIDED**

**SPECIALISED ACCOUNTING PACKAGES AVAILABLE  
incl. Motor Vehicle Workshop (NABS)  
The Small Business Accountant (SBA)**

## **INTERFACE ELECTRONICS PTY. LTD**

**21 Raleigh St. Coffs Harbour NSW 2450**

**TEL: 066 528 643**

**DEALERS \* CAIRNS - MEMDEX BUSINESS SYSTEMS (070) 311 577 TOWNSVILLE - REEFTOWN OFFICE CENTRE**

**(077) 72 6633 21<sup>ST</sup> CENTURY BUSINESS SYSTEMS - PERTH (09) 321 8902**

**BRIZCO SALES PTY LTD BRISBANE (07) 252 3346**



# Epson's faster than NEC. But guess who's faster than Epson?

Competition is good for business. Prices become keener. Research and innovation are encouraged. So it's good to see those two fine companies, Epson and NEC, going at it hammer and tongs.

Particularly memorable is the tv commercial in which an Epson computerised cowboy outdraws and kills an NEC cowboy. It's a graphic demonstration of speed.

However we would like to point out the Zenith Z-386 and Z-248 PCs bench test significantly faster than anything either Epson or NEC can offer. And to add insult to injury, the prices of these powerful US built Zenith PCs are no more than their slower competitors.

The secret of this exceptional performance lies in zero wait state, a technology created and pioneered by Zenith.

The wait state refers to the number of additional cycles the processor must wait between accessing and getting a response from the memory.

As little as one wait state can reduce system performance by 50%. And most conventional 286 and 386 based PCs require several of them.

To overcome the problem,

Zenith developed new performance enhancers. Among them paging memory architecture, burst-mode and cache memory. Together they eliminate the problem of wait state.

the whole world.

Infocorp states it has a massive 20% share of the North American retail market. It's also the largest supplier of micros to the US Federal Government.

Here in Australia Zenith is growing rapidly. Available through leading PC suppliers and supported by a nationwide team of engineers, Zenith PCs are being purchased by dedicated computer users of all kinds.

If you would like to know more about the exceptional Zenith range of micro-computers and the name of your nearest authorised stockist, call Jane Eggleton on (02) 417 7999 or fill in the coupon.

POST: Zenith Data Systems Pty. Ltd., Unit 4, 72-74 Gibbes St,

CHATSWOOD NSW 2067.

FAX: (02) 417 7676.

Dear Jane Eggleton, please tell me more about Zenith

Desktop PCs ☐ Portable PCs ☐

Name \_\_\_\_\_

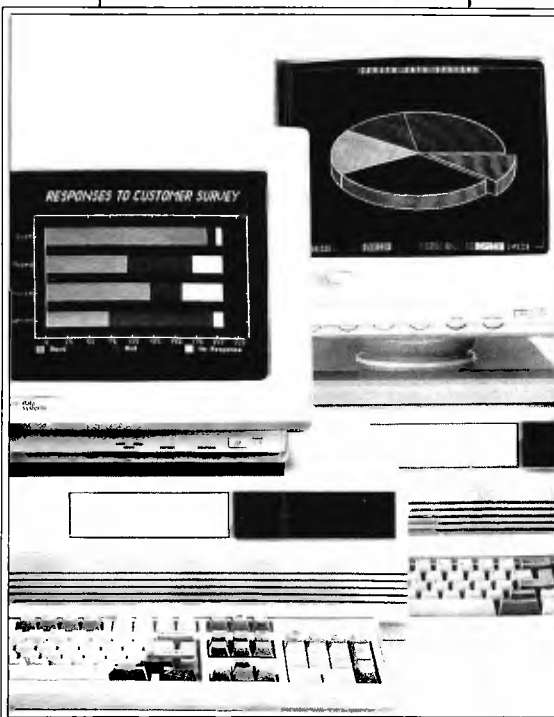
Company \_\_\_\_\_

Address \_\_\_\_\_

Tel. \_\_\_\_\_

**ZENITH** data systems

THE WORLD'S MOST EXPERIENCED MICRO COMPUTER COMPANY.



But speed alone doesn't make for first class performance. Versatility and reliability are vital. And they're just two of the reasons the US Department of Defense gave for making the Z-248 its standard high performance desktop PC. The Z-386 goes one better by bringing supermini performance to desktop micros.

Today Zenith is one of the largest and longest established producers of PC compatibles in

H  
T  
I  
N  
E  
Z

# SCREENTEST

entered above the salutation, so it must go at the bottom of the page. In Ventura 1, the only way to ensure consistent placing, whatever the length of the letter, is to have a separate frame for the destination address. Now, I can use a paragraph tag which is aligned to the bottom of the page, and, provided the bottom margin is correctly placed, it works a treat.

The way to apply background tints to text in Ventura 1 is to put the text in a frame and give the frame the desired background, but you cannot do this for header and footer frames. Ventura 2 removes this constraint.

Apart from automatic increment of counters across chapters, the other feature notably lacking from Ventura 1's long document features was cross-referencing, both for text references and for 'continued on page . . .' messages in magazines. This is provided in the Professional Extension. You can insert at a cross-reference point a chapter, page, figure, table or section number, caption text or variable text.

This last can be used not just for the obvious true cross-reference and call-outs, but also for substitution — for example, of the current date of a frequently used document, the name of a company in a formal contract, or any of the hundred and one uses to which a word processor's mail-merge features are put. The location mark to which a cross-reference refers is entered directly into the text or, for references to a frame, through its anchor name.

## Table features

Tabular facilities in Ventura 1 are good but rather fiddly to implement. The basic version of the new product has a number of significant enhancements; in addition, the Professional Extension provides more goodies of a high quality.

In the basic version of Ventura 2, you can create tables where columns align on the decimal point, with the alignment point specified as being the right margin. This makes it possible to include tables without any special formatting characters at all, and in most circumstances would avoid the need to remove all those spaces between columns so thoughtfully included by the 'Print to File' facility of most spreadsheet packages. A parallel improvement aligns tabbed paragraphs correctly, even where they include integers (that is, numbers without a decimal point) in parentheses. Moreover, where tabbed formats include leaders, these can be extended over null columns without the need to include the correct

# OUTSTANDING SOFTWARE

For IBM PC's and Compatibles

At last FREE-SOFT® International is here! We have more than 900 programmes in our international library, you can get any disk for \$12, and if you join FREE-SOFT NETWORK® it will be \$10 only per disk! plus getting our SOFT-LINE® Newsletter.. full of tips to help you get the most out of your PC! plus receiving regularly our SUPER-SOFT® sheet listing in details the best 10 software programmes available in our library! plus SPECIAL PRIVILEGED STATUS® .. you will have advance access to the latest Public Domain and User-Supported software programmes before its release to the public! plus having 24 hours, 7 days hot line to order from! Membership in the NETWORK is \$39 annually! So, may we say.. WELCOME to the world of FREE-SOFT.

# 0125 PC-PROFESSOR — Your computer will teach you all about BASIC programming in colour!

# 0180 PC-TUTOR — Tutor will teach you all what you need to know about Your PC and its DOS!

# 1000 PC-WRITE+ — Super word processor, comes in 2 diskettes, this is part 1, full-featured package with 55000 word dictionary in colour, even support a Laser printer.

# 1001 PC-WRITE+ — Part 2 as above.

# 0054 SIDE-WRITER — It will allow your printer to print SIDEWAYS on paper! a must for lotus users!

# 0051 EZ-FORMS — allows you to generate master forms tailored to your need. Super for business.

# 0028 PC-MUSICIAN — Great programme, you can create and play songs on your PC!

# 1003 PC-FILE+ — Just when you thought PC-FILE couldn't get any better File+ create new standard in Database managers, comes in 2 diskettes, this is part 1, it is easier, faster and more. . . more powerful.

# 1004 PC-FILE+ — Part 2 as above.

# 0130 PERSONAL FINANCE MANAGER — Good personal accounting system. You can keep track of all household money matters from Cheque account to Investments.

# 0148 PC-TOUCH — Your Computer will be your typing tutor, let you go at your own pace and keep track of how well you are doing.

# 0147 SLIDE — Images can be created, edited, saved, displayed and printed using the programme. Handy for Desktop Publisher.

# 0172 THE LIBRARY for lotus — 20 Super worksheets for lotus 123, from Cheque Book balancer. Cash Flow Manager to New Venture Budget!

# 0197 HARD DISK UTILITIES — Super collection of Hard disk Utilities from a utility tells you which files have not been backed up to the one helps you create sub-directory no one knows about but you!

# 0174 KID'S WORD PROCESSOR — Excellent word processor written for Children (and adult too!) in super colour and sound, features graphic menus and the lot!

# 0175 PC-DRAW # 1 — A must as a part of your Desktop Publishing Library, it is a combination of programmes, providing keyboard, screen drawing, graphics printing and slide show capability.

# 0176 PC-DRAW # 2 — A selection of drawings and pictures made by PC-Draw #1, plus a super slide show, you must have PC-DRAW #1 to be able to use it.

# 0201 PROCOMM — The professional communications programme, if you have a Modem then you need Procomm.

# 0046 PTROOPER — A game, in Super Colour, keep the invading paratroopers from landing in your country!

# 0049 PC-CHESS — Very good Chess game, you can play against the computer or a friend!

# 0065 AFGHAN-WAR — Good WAR GAME, in colour based on Afghanistan War.

# 0157 LANDER — In excellent graphics and colour, can you land a space ship on a pad without crashing?

# 0165 SPACEWAR — Arcade game in colour and graphics, combines the best features of Asteroids and Startrek with a few tricks of its own!

SPECIAL  
ANY  
5 DISKS  
PLUS  
1 YEAR  
MEMBERSHIP  
ONLY  
\$39

## YES!

I want the best! Send me my MEMBERSHIP KIT in FREE-SOFT NETWORK®, plus the following diskettes. (write catalogue # of any FIVE of the above list)

At your SPECIAL OFFER for ..... \$39  
Plus, postage & handling ..... \$ 3  
(if you want more than five diskettes, just add for each extra diskette \$10)

As per ☐ My Cheque ☐ Bankcard ☐ Visa ☐ MasterCard ☐ Am. Express

Card No. .... Exp. Date .....

Signature ..... Name .....

Address ..... Sub. ....

State ..... Postcode ..... Phone .....

Post to ... (No stamps Needed) ... FREE POST No. (1),  
Or by using our 24 hrs, FREE-SOFT International,  
7 days a week, P.O. Box 398,  
HOTLINE (03) 859 4697 NORTH BALWYN, VIC. 3104.

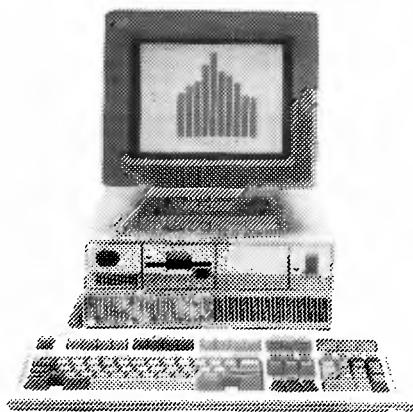


FREE-SOFT  
INTERNATIONAL  
LIBRARY



# We don't claim prices and quality—

**HERE'S WHY — SAVE UP TO \$8000 ON IBM**  
Fantastic savings and rebates



## IBM MODEL 30.286

Recommended retail \$4678

**NOW LESS \$1200**

*You Pay only \$3478*

Its a smart choice for a office of every size. Offering high performance computing at an economical price.



## IBM MODEL 70 (60Mb)

(386 Microchannel)

Normally \$11 800

**NOW LESS \$ 2 800**

Plus Extra rebate \$ 2 100

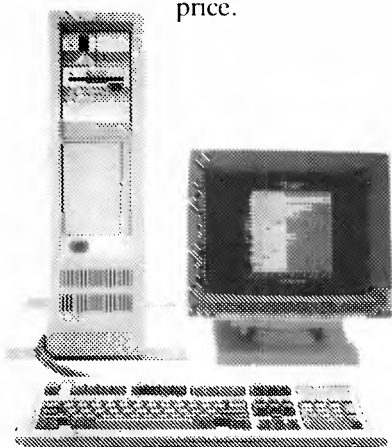


## IBM MODEL 80 (110 Mb)

Recommended retail \$22 820

**NOW LESS \$ 5 500**

Plus Extra rebate \$ 2 500



## IBM MODEL 50 (60Mb) (286 Microchannel)

Normally \$8990

**NOW LESS \$2100**

Plus Extra rebate \$1000

*You pay only \$5890*

The model 50s are fast, versatile, reliable and easy to use.

**\* TRADE WELCOME**

**Opening soon  
in Sydney**

## Super Specials

Mini Scribe 40 MBN at  
hard disk ..... **\$575**

Seagate 20 MG hard disk  
complete kit ..... **\$458**

Seagate 30 Mg hard disk  
complete kit ..... **\$522**

Microsoft genuine mouse  
for XT, AT, PS/2 ..... **\$219**

**FREE MOUSE MAT  
FIRST 50 UNITS SOLD**

## Monitors

Composite Amber suit. Apple BBC  
Commodore ..... \$99

TTL Green (ZDin) very high res ...

..... \$149

TTL/Comp. Dual FREQ Dataland

Amber..... \$186

CGA (Color) AOC 640 x 240 inc

swivel base ..... \$492

EGA AOC Hi-Res ..... \$660

inc swivel/tilt base

EGA Monitor & VEGA

EGA card ..... \$980

## Hard Disks

20 Mb Seagate Drive..... \$299

40 Mb CDC voice coil drive... \$888

## Back up Units

Colorado Tape Units

40 MB XT..... \$699

40 MB AT..... \$699

40 MB EXT..... \$995

## Diskettes

**Made in Aust. Brand No. 1 by  
"DATA LAND"**

5¼".....\$75 (100 lot)

3½".....\$139 (50 lot)

(Inc. free head cleaning kit)

5¼ AT.....\$88 Box 50

## Disk Drives

5¼ Double sided XT ..... \$145

5¼ AT drive..... \$199

P S/2 5¼ Ext drive..... \$460

3½" kits (XT & ATS)

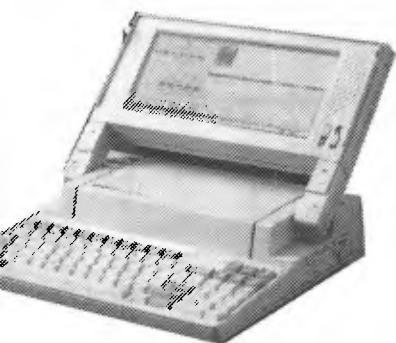
720 KB..... \$219

1.44 MB..... \$350

1.44 MB Controller..... \$98

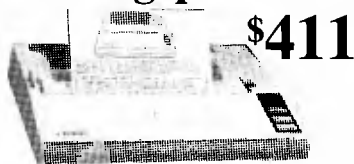
# To have the best We Guarantee it!

**Unbeatable prices  
on Lap Tops**



Epson ..... \$2888  
Epson 20Mb ..... \$4800  
Toshiba 1000 ..... \$CALL  
Toshiba 3200 ..... \$CALL  
Toshiba other products \$CALL.

**Epson — Australia's  
No. 1 selling printers**



**\$411**

**Bonus offer**  
Pkt paper and cable just \$29.

## Epson LX800

From the big mover in Epson with 12 months nation wide warranty LX800 T/F Feed 180 CPS + NLQ. Totally IBM compatible, but will fit almost any computer. The best buy in Australia.

## Epson LQ500

The very latest in 24 pin technology. 180 CPS and 50 CPS, LQ tractor fiction and sheet feeder. \$630

**Bonus offer — Pkt paper & Printer cable just \$29.**

**ULTRA** *from* **IMAGINEERING**



**Data Parts for the best price  
on all ULTRA products**

## Computers

ataland 8000 computer  
K FDD, 101 KBB, 20 Mg Seagate  
onitor etc ..... \$1680  
cludes Bonus Software

## Modems

ew Dataland by Maestro ..... \$398  
odel 2400 2XR  
400 Band V21, V22, V23  
22 BIS  
uto Answer, Auto Dial/Dis Conn

## Other Hardware

opy Holders ..... \$22  
3M Joysticks ..... \$39

Printer Switch Box ..... \$55  
XT 10 MHZ mother board .... \$219  
ZNIX Mouse ..... \$99  
IBC Midi Cadet ..... \$CALL

## Epson

GQ 3500 Laser Printer  
(save ..... \$1500) ..... \$2499  
EPSON LQ 1050 ..... \$CALL  
EPSON EX 1000 ..... \$CALL  
EPSON AT-AX Special ..... \$CALL

## Microsoft

MS word ..... \$644  
Quickbasic ..... \$116  
Works ..... \$299

Flight Sim ..... \$82 (EGA)  
Windows (148  
Mouse & Windows ..... \$299  
Quick C ..... \$116  
Full Range ..... \$CALL

## Ultra Computers

Ultra XT 640K, cards 101 KBB TTL  
screen ..... \$1382  
Ultra XT as above,  
dual drives ..... \$CALL  
Ultra XT 640K, 101 KBB, TTL  
Screen 20 MB ..... \$1850  
Ultra XT 30 Mb ..... \$CALL  
Ultra AT/20 screen ..... \$2850  
Ultra AT/40 ..... \$CALL  
Dos 3.30 ..... \$140

## Pronto Order

Please freight me overnight the following:

**Ask for a free catalogue**

Enclosed please find cheque, purchase order, credit card for .....

Name: .....

Address: .....

The best computer people in the country

# DataParts

MAIL ORDER CENTRE  
11 Edward St Shepparton 3630  
Phone: (058) 21 7155 Fax: (058) 22 2800

**Telephone your  
order now**

Available from these outlets-

● Melbourne  
Phone: (03) 20 7895. Fax: 209 7737

● Shepparton  
Phone: (058) 21 7155. Fax: (058) 22 2800.

**Credit Cards**

OR OUR AGENTS:  
PORTLAND COMPUTERS  
Portland. (055) 23 1051  
WOLLUNDY COMPUTERS  
Wagga (069) 21 6466  
BODNAR COMPUTERS  
Bellerive (002) 44 4218

ESB Consultancy  
Kalgoorlie (090) 912 523  
AEGIS Computers  
Newcastle (049) 29 2211  
Taitronics  
Chipping North  
(02) 72 7905





THE AUSTRALIAN BONDWELL DISTRIBUTOR  
PROUDLY INTRODUCES THE

# Bondwell®

**PRO**



**Model 8T**

## Turbo Ultra-Compact PC with Supertwisted Display

Amarac, a leading minicomputer systems house have joined forces with Advanced Technology Computers, renowned for outstanding hardware, customer service and support in the desktop IBM PC field, to bring you the highest quality laptop portable range in Australia.

**Hard Disk Version**

**Dual Floppy Drive Version**

**Model B-300**

**model BW-8TH**

**model BW-8TD**

**80286 processor arriving soon!**

- 80C88 microprocessor operating at 4.77 or 8MHz (switch selectable)
- 8087 numeric data coprocessor socket
- One megabyte of random-access memory
- Supertwisted liquid crystal display with backlight
- 80 column text display
- 640 by 200 pixel graphic display
- Two 720 kilobyte 3.5in microfloppy disk drives (Dual Floppy Drive Version)
- One 720k 3.5in microfloppy disk drive and one 20Mbyte Winchester 3.5in hard disk drive (Hard Disk Version)
- 95 key low-profile keyboard
- Real-time calendar/clock with battery backup
- Built-in rechargeable battery for system power supply
- 1200 bps Bell/CCITT Hayes<sup>1</sup> -compatible modem
- Standard RS232C communication port
- Centronics parallel printer port
- RGB video port
- NTSC composite video port

\*One year full warranty with optional extended warranty plan

\*MS-DOS 3.21, GW-BASIC 3.2, EASY 1.5 Word Processor, and utility programs with complete manuals

\*internal application ROM expansion sockets

\*battery charger/mains adapt

\*up to six hours operation with full battery charge

**\$3295**

**\$2495**

For further information and demonstration, please call:

**Advanced Technology Computers**

14 Prior Crt Rowville Victoria 3178  
on 763 4555 or 763 4102.

For minicomputer sales and service, call

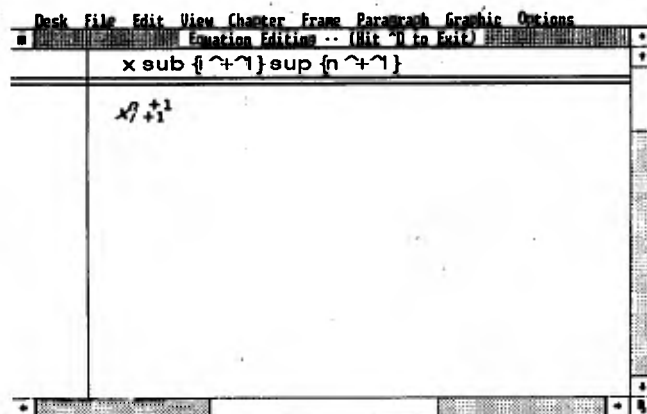
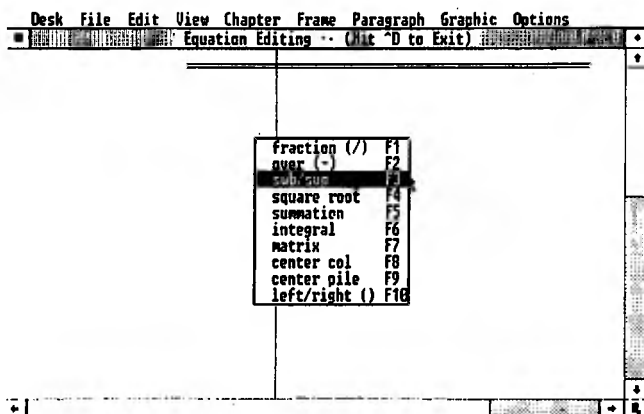
**Amarac Computer Corporation**

on 241 7346

3rd Floor, 56 Claremont Street, South Yarra  
3141 Victoria

1. TM Hayes Microcomputer products, 2. TM Microsoft Corporation 3. TM MicroPro International Corporation

# SCREENTEST



Here, the user has typed an 'x' and invoked the Help list (through CTRL/C) of some of the characters and symbols available. A more complex symbol is shown: the characters above the double line are those entered by the user; those below will appear on the screen and when printed. The carat characters in the entered line represent spaces which must actually appear in the equation

number of dummy tab characters to reach the end of the paragraph.

The Professional Extension provides a complete set of functions for creating tables, including filters for importing tables from the most popular spreadsheets. There is a new mode called, not surprisingly, Table mode (in addition to Frame, Text, Paragraph and Graphics) in which you can create and import tables, specify the number and sizes of rows, columns, spacing and rules for tables, shading for cells and alignment of figures or text within them. The contents of each cell are tagged separately, initially, in a manner analogous to the treatment of text, with a standard tag, but you can, of course, modify that tag or change it for particular cells or groups.

The approach used by Ventura 2's Professional Extension provides a neat compromise between the highly structured but typographically naive approach of the spreadsheet, and the good typography and total lack of structure in most desktop publishing programs.

## Maths and scientific text

In the basic version of Ventura 2, you can now employ horizontal and vertical fraction bars which, with the use of smaller point sizes and base-line adjustment, will make it possible to include simple fractions properly. For full equation handling, you will need the Professional Extension. This allows you to select the point in the text where the equation is to appear, and then type it into a special equation dialogue box where symbols, synonyms, Greek and trigonometric characters can be correctly understood.

Symbols include double-height characters such as the integral sign, a

bar to separate divisor from quotient, correctly placed square root symbol with bar over the full operand, and so on. The format is very similar to a specialist equation language called EQN, and though not a maths specialist I had no trouble using it.

## Graphics drawing within Ventura

Most people would agree that the internal graphic drawing facilities form the weakest area of Ventura 1. I recently spent many unhappy hours constructing a short software manual based entirely on captioned screen-shots. The ability to place, scale and crop frames precisely and automatically (quite an argument when you have a hundred or so) persuaded me to use Ventura rather than PageMaker for the task. But the fiddly nature of the user image, in which you must create a frame before you can draw even a straight line independent of a paragraph, and select a frame before selecting the graphic to edit, not to mention the impossibility of enforcing perpendicularity in line drawing, nearly drove me crackers. (I found the last of these the most incomprehensible, given the involvement of the creators of Ventura in designing and writing GEM Draw.)

However, in Ventura 2 these problems have largely disappeared. Graphics can be selected directly, without first choosing the frame to which they belong. Frames can be drawn from within the graphics mode if you want to anchor graphics to a particular frame, and all other frame options, such as scaling, are also available. Alternatively, graphics can be drawn on the underlying page without (as was the case in

Ventura 1) the graphic then appearing on every page. (This facility can now be requested.) And, when drawing any figure, you can achieve perfect perpendicularity (for lines, rectangles and so on) or symmetry (for circles, ellipses and so on). Lines can also be constrained to a 45 degree angle. Signs of relief all round.

## Importing graphics

Ventura 2 at last allows the import of TIFF files, thus significantly improving compatibility with scanners and making life easier for people who use both PageMaker and Ventura. Most TIFF functions are supported apart from colour.

With PostScript printers, Ventura converts the TIFF grey-scale information to PostScript grey scales, and you can then use a new menu called Image Setting to set PostScript half-tone controls. For non-PostScript printers, dithering is handled by Ventura.

A major benefit of the Ventura approach to graphics is the ability to anchor frames to text so that when the text moves, the associated graphic is also moved. In Ventura 1, this method is rather cumbersome for small graphics, especially as the frame does not move until re-anchoring is explicitly requested, and positioning is not always as precise as this kind of frame requires. Ventura 2 provides the ability to anchor small frames in-line, so that drawings and symbols which are actually part of a line can be tied to it and move automatically and immediately as the paragraph moves. The new feature for automatic alignment of line spacing ensures that adjacent lines do not overprint on the in-line drawing.



## Screen display

A major drawback when including sections of PostScript within a Ventura chapter is that you cannot see what is actually there — you just get a big cross over the frame (and not accurately positioned at that). The problem is that, until Display PostScript arrives for real, there is no screen representation to show. But some programs which create PostScript also create a TIFF or Windows metafile representation of the graphic, which can be displayed in Ventura 2.

Another feature aiding screen display is the use in Ventura 2 of VGA fonts on those monitors with a resolution higher than EGA, to give a clearer picture.

## Printing

Some modest improvements have been made to output facilities. The two I shall bless most are the display on the Print menu of the current device and width table (no more forgetting that my last output was a 'print to file' — why isn't my printer working?), and the ability to hide the display of pictures for the current page only, which, when used before printing, also suppresses the printing of pictures on that page.

This will make it possible to get a quick draft of the current page, with all text and frame positions but minus the graphics themselves, thus significantly speeding up the process of drafting.

The facility to display TIFF or Windows metafile representations of PostScript if they are present has also been extended to allow their use in the printing of PostScript graphics on non-PostScript printers, albeit at bit-map resolution. And colour in GEM.IMG files is printed in shades of grey on non-colour printers, again to improve drafting.

## Housekeeping

In the basic version, it is possible to print a style sheet but not to copy tags between styles; find out which chapters use a particular style sheet; or any of the other goodies which come from utilities like WithStyle from Pecan Software. The Professional Extension needs EMS and uses it to provide much more data space. This should speed things up by eliminating disk paging. It should also eliminate, for all but the most perverse applications, the dreaded 'page too complex to format' message often seen in Ventura 1 when formatting directories, price lists and other documents with large numbers of tab characters and/or tags on a page. Much useful work has already been

done in the area of database publishing: with this latest advance, it should really take off.

## Using Ventura 2

The basic user image has been retained, with minor adjustments and some useful enhancements. You can now choose between drop-down menus (the original GEM form) and pull-down menus (as in PageMaker and other Windows applications). Many full-screen menus have been brought together into a single menu with sub-options, which are displayed by dragging on a double-headed arrow beside the option. For example, all counters for chapters, pages, figures and so on are now brought together in a single menu, in a much more coherent way, thus reducing the brain-strain of remembering where each one is.

There are also some new shortcuts: a control key can be used to cancel a dialogue box instead of the mouse, and the same control key can be used to recall the most recently invoked dialogue box. When you need to load or save a file, the dialogue box no longer returns to the start of the file list each time but displays the part of the list last displayed — a big time saving when loading a series of files, such as a set of screenshots. Faster adding and editing of markers such as frame anchors is provided.

And, when you add a box text graphic or a footnote, you no longer have to delete the text 'Box Text' or 'Footnote' before typing your entry — just the end-of-file marker is shown (and it appears even if you have Hidden Tags and Returns).

There are some important improvements for novices, too, perhaps the most needed being the provision of online help on virtually every dialogue box through a question-mark symbol — you can see this in some of the example screens. If you use the Save (rather than Save As) option to save a new chapter, Ventura 2 automatically gives it the same name as the text file placed in the underlying page. And when using the Text mode features for enhancing text rather than creating a new tag, you no longer need to be precise when selecting the text to be enhanced: the typographical change can be extended to the whole line or paragraph on request.

Another improvement for novices provides a neat example of the forethought which has gone into the user interface of the new version. If, in Ventura 1, you type text into the underlying page without specifying a text file to store it, you are asked if you really want to do

that, and if you do, asked to name the file. In an attempt to help novices, who apparently find this confusing, in the same situation Ventura 2 assumes you want to start a new text file and just lets you keep going, giving the file the same name as that under which you save the chapter. Fine, you say. But, especially if you are working on a conventional monitor (even EGA) with its not very marvellous resolution, it is very easy when editing items such as extended caption frames to select the underlying page by mistake.

I had feared that the attempt to aid novices would give real problems in this situation. But the program is clever enough to take alternative action if a page already contains some text within specific frames, and gives you the dreaded bleep and error message which is really the only other option.

## Conclusion

Any reaction to Ventura 2 needs to distinguish clearly between the basic version and the Professional Extension. The basic version includes a whole range of enhancements, some, in particular those concerning typography and graphics, of considerable importance, others more modest but nevertheless valuable. They will go a long way to meeting the criticisms which typographers and people with multi-purpose applications have levelled at the initial releases.

The Professional Extension, however, does much more than that. Its facilities fall into two classes: those which are natural extensions of Ventura 1's features, and those which should make Ventura 2 useful to several groups of users who have not up to now had any natural source of desktop publishing facilities. In both areas, the options provided have been well thought out, using current 'standards' if they exist, and giving a wealth of easy to use features. My only significant disappointment is that Ventura 2 seems to miss some opportunities to extend the 'batch processing' aspects of its use. In particular, the ability to create a set of identical frames more easily, to fill each one from an ordered list, and to record a sequence of keystrokes to ease the tailoring of specific applications, would all have been very welcome. That said, and despite the occasional frustration, I was more impressed by Ventura 1 than by any other new product I had reviewed in the preceding five years in any application area. Ventura 2 lives up to that promise in a mature form.

END

# HEARNE MARKETING SOFTWARE

*The leading brands of American marketing and statistical software packages for microcomputers.*

## STATISTICS

### CSS

A comprehensive statistical package, menu driven and incorporating elements of artificial intelligence. Has the unique Shrollsheets system for creating graphs at the touch of a button. Additional modules available include survey and cluster analysis, and, more importantly, a programming module, the Development Environment, which converts CSS into an "Open Architecture" system comes with the standard package. The CSS intelligent interface can read/write all common file formats (Lotus 1-2-3, DB111+ DIF, SYLK, etc.). \$900  
CSS Demonstration Disk.....\$20

### STATS+

The popular, easy package with statistical data base management and analytic graphics, incorporates elements of artificial intelligence. Additional modules can upgrade this to a full CSS package. Can be used as statistical supplement for Lotus 1-2-3, D-Base 111 Plus and other programs .....\$300

### STATGRAPHICS\*

This is a popular and easy-to-use statistics/graphics software package for your microcomputer. It integrates statistics with high resolution graphics in one single software system. Full System .....\$1550  
Demonstration Disk.....\$20

### StatPac Gold

A fully integrated package containing a complete data management system, basic and advanced statistics tables, graphics and utilities. This is the professional package for marketing researchers, social scientists, medical researchers, etc. ....\$900  
Statpac Gold Evaluation copy (inc. manual) .....\$100

### MacSS

**For the MACINTOSH**

A comprehensive high performance statistical package integrated with statistical database management functions and graphics. The ideal alternative mainframe statistical package designed for the Macintosh. ....\$250

## FORECASTING

### SmartForecasts II

The ultimate Expert System forecasting package for the marketing profession. You feed the data and the Expert System automatically selects the most appropriate forecasting technique and presents you with the results in chart or tabular form. Voted the best package of its type in the United States .....\$990  
Smartforecasts II Demonstration/Trainer Disk .....\$20

### Forecast Plus

Forecast Plus from Walonick is the most powerful forecasting tool ever created for the microcomputer. It is a graphics forecasting package for short and long range predictions .....\$900  
Forecast Plus Evaluation Disk (inc. manual) .....\$100

### FORECAST PRO

This package uses artificial intelligence and forecasting methodology to bring you unsurpassed forecasting accuracy. It examines your data and guides you through exponential smoothing Box-Jenkins or regression, whichever is the most suitable .....\$900  
Forecast Pro Demonstration Disk.....\$20

## MARKET RESEARCH

### The Survey System

Program for entry, editing, processing and presentation of survey research data. The Australian standard package includes the Open End and Real Numbers modules. With its optional modules it is the most comprehensive package available for working with questionnaire data on a micro .....\$1,400



This Strawberry program produces crosstabulations from imported raw data. It uses the familiar draw-down spreadsheet menu. You can actually see the table that you are creating. A-Cross can handle an unlimited number of respondents, produce tables of 100 rows and 26+ banner points. It can write tables directly as Lotus worksheets, so you can use the full range of Lotus graphics, maths and editing capabilities. (Used by many companies in the Fortune 500) .....\$1,650  
Evaluation Disks (including instructions).....\$100  
Demonstration Disk.....\$20

### Conjoint Designer

Conjoint analysis has become the leading technique for designing new products, product line extensions and product modifications. Conjoint Designer allows you to produce full profile conjoint designs which estimate the respondents' preference or utility function.

### Conjoint Analyzer

This is a comprehensive analysis package with everything from data entry and cleaning to market simulation. It offers three types of models and use of the appropriate model, which can greatly increase reliability.

### Simgraf

This package introduces new simulation models which overcome limitations of the standard models used in conjoint analysis software. Simgraf has techniques for eliminating typical biases in conjoint analysis and produces a more realistic simulation of market behaviour. Each Conjoint Package.....\$950  
Demonstration Disk (inc. manual).....\$100

## MARKETING

### OXISTAS

Designed exclusively for marketing management. Automatically undertakes modelling, calculates elasticity of demand, correlation, what-if analysis, impact and target analysis, simulation and forecasting. Can export and import to and from Lotus 1-2-3 .....\$700

### OXISCAN

This easy-to-use integrated marketing management system manipulates data for profitable decision making. It handles scanning data and undertakes automatic measurements of key determinants of demand, including, retail price, advertising features, displays, distribution and household panel activity. These two Oxicon products are used by some of the leading consumer goods producers in the United States. ....\$1,750

Sales tax and delivery included in above prices. Site licences available to educational institutions. Technical support available to all clients. Dealer enquiries welcome. Prices subject to change.

**Tel: (03) 497 4276 Fax: (03) 499 7410**

**HEARNE MARKETING SOFTWARE**

37 Marshall Street, Ivanhoe, Victoria. 3079





# WE DIDN'T INVENT REMOVABLE MASS STORAGE. WE SIMPLY PERFECTED IT.

First came piles of documents and bulging filing cabinets. Then, tape drives and floppy disks. Now, the Bernoulli Box® — the perfect solution to manage, store and share your ever expanding flow of data.

With 20 Megabyte removable disk cartridges — in single and dual drive, 5¼" or 8" systems — you have the best of hard disk performance and unlimited secure data storage. No wonder the Bernoulli Box is the standard for more than 150,000 users.

## Never runs out of storage

Because Bernoulli™ uses removable 20 Mbyte cartridges, there is no limit to your data storage.

For another 20 Mbytes or even 500 Mbytes, just add more low cost Bernoulli cartridges.

## Fast access, fast backup

Transfer your data at hard disk speed. And preserve that data on true "working copies"; no need to "restore" data to use it. Backup tasks that would take stacks of floppies are

copied easily on one 20 Mbyte cartridge in as little as 2 minutes.

## Easy to protect, easy to share

Your data is truly secure when you lock cartridges away in your safe or desk. And to share your data, just carry a compact Bernoulli cartridge down the hall or drop it in the post. Try that with your PC's hard disk!

## The long term, low cost investment

We've designed Bernoulli Boxes to work with any IBM® PC, from the original to the PS/2 80™, IBM compatibles and the Apple® Macintosh™, so Bernoulli is an investment you won't outgrow. As you expand your data, just add more low cost cartridges, for a lower cost per megabyte.

Every reason for PC World Magazine to name the Bernoulli Box a "World Class Product" in 1985, 1986 and 1987.

So, check the Bernoulli Box range now. Just call Sourceware (02) 427 7999 for more information.



# OMEGA®

**Number 1 in removable data storage.\***

Sourceware - Unit 1, 6-8 George Place ARTARMON N.S.W. 2064 Tel: (02) 427 7999 Fax: (02) 427 7642

Iomega International - Excelsiorlaan 39 box 3, 1930 Zaventem (Brussels), Belgium. Fax: 0011-32-2-720-5463. Telex: 20641.

\*According to the 1987 DISK/TREND report. IBM is a registered trademark, and PS/2 80 is a trademark of IBM Corp. Apple is a registered trademark, and Macintosh is a trademark licensed to Apple Computer Inc.

# Floating-point without a coprocessor

*Emulating a maths chip is fine, but you still need some way to talk to the outside world. Rick Grehan walks us through the second part of a floating-point mathematics package.*

In the September issue of *APC* I introduced a binary floating-point mathematics package and described the code for the four primary math operations: addition, subtraction, multiplication and division. Using those routines, you can build the more complex functions — transcendental and trigonometric, for example — that you find in high-level languages.

But there are a couple of ingredients still missing from the recipe. Although you can manipulate floating-point numbers with the functions I've given, you need to be able to get numbers to and from the routines. I can remember when I toggled in my first program on my old Altair 8800's front panel and showed my mother its results on the accumulator LEDs.

"Look, mum! That light means a two, that one means an eight, and that light means a 16, a total of 26!"

"That's nice dear."

A mathematics package with no easy way to get the numbers in or out is not much better. It's time for some I/O.

## Inside/outside

As you'll recall from September, the floating-point format I've defined accommodates storage for a 15-bit exponent, an 80-bit mantissa, and a one-bit sign (which needs a separate byte of its own; you may want to refer to the diagram on

page 100 of *APC* September issue). All this requires 13 bytes of storage per number local to the package. I referred to this storage area as the 'floating-point accumulators', FAC1 and FAC2.

However, a program that calls the package is not likely to want to allocate 13 bytes of storage for each floating-point number: a large array of such numbers can consume memory rapidly. And the format I've described uses an entire byte to hold the mantissa's sign. This is necessary only to make the execution of floating-point operations faster. When a number is being stored externally — waiting around until you use it again — it doesn't make sense to use eight bits to store the sign when one bit will do.

Listing 1 shows the pseudocode for a pair of routines called LDFACC and STFAC1. LDFACC loads one of the two floating-point accumulators (selected by the DI register) from an external memory location, assuming that the number at that location is in external floating-point form. STFAC1, the reverse of LDFACC, stores the number in FAC1 to an external location. I didn't provide a routine for storing FAC2 anywhere, because the four operations I've so far defined all leave their results in FAC1.

The external representation the package uses is very close to the 10-byte extended format used by Apple Macintosh's Standard Apple Numeric Environment library

(which is compatible with the IEEE 10-byte extended definition). My numerics package doesn't define special cases like NAN (not-a-number) and infinity as defined in SANE, but some intrepid programming could add such entities; in fact, you can make the package compatible with whatever you want.

Most of these routines' time is spent shifting and masking. The external representation stores the mantissa's sign in the highest bit of the exponent (a bit that, internally, is used to detect exponent overflow). Also, since the normalisation routine I presented in September aligns the mantissa so that its topmost bit is 0 (to catch overflow), STFAC1 shifts the mantissa before storing so you don't waste space storing an empty bit.

Actually, you can grab one more bit's worth of accuracy in the external representation if you consider that, unless the floating-point number is zero, after one shift to the left the most significant bit of the number must be a one. You could rewrite STFAC1 to perform a second shift before it stores the number. Then, rewrite LDFACC to recover those top two bits by shifting the mantissa to the right twice and setting the highest two bits to 01 binary. The IEEE and Microsoft formats for encoding short and long real numbers use this trick.

You can modify the load and store routines to customise your own external



**XT\* TURBO MOTHERBOARD**

- 8MHz
- 8088 Processor
- Expandable to 640K on board.
- Provisions for up to 6 x 2732 EPROMs on board
- Keyboard connector
- 8 Expansion slots

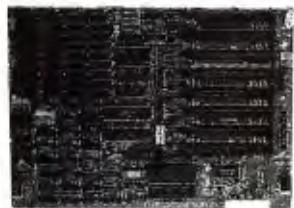
X18030 (excl. RAM) ..... \$169

X18031 (incl. 640K RAM) \$699

**6/10 MHz AT\* MAIN BOARD**

- 6/10 MHz system clock with zero wait state
- Hardware and software switches for alternative system clock.
- Rechargeable battery backup for CMOS configuration table and real time clock.
- 80286-10 microprocessor
- Socket for 80287 numeric data co-processor
- 256KB, 512KB, 640KB, or 1,024KB RAM
- 64KB ROM, expandable to 128KB
- 8 Input/Output slots
- Hardware reset jumper
- Power and turbo LED connector
- Phoenix BIOS

X18100 (Excl. RAM) ..... \$689

**10 MHz XT\* TURBO MOTHERBOARD**

Increase the performance of your sluggish XT\* approximately four times with this super fast motherboard.

- 8088-2 running at 10 MHz, no wait state
- Turbo/Normal selectable
- 640K fitted
- 8 Expansion slots
- 4 Channel DMA
- Keyboard port

Excluding RAM . \$199

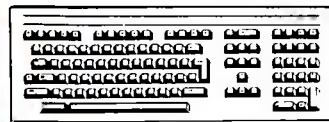
Including RAM) . \$749

**BABY AT\* MOTHERBOARD  
(WITHOUT MEMORY)**

- 6/10 MHz system clock with zero wait state.
- 80286-10 Microprocessor
- Hardware and software switchable
- Socket for 80287 numeric data co-processor
- 256K, 512K, 640K, or 1,024K RAM
- 64K ROM
- Phoenix BIOS
- 8 Expansion slots

X18200 (excl. RAM) ..... \$689

X18201 (incl. 640K RAM) \$1,299

**IBM\* COMPATIBLE  
EXTENDED KEYBOARD  
(101 KEYS)**

These new keyboards are both XT\* and AT\* compatible!

- 20 Dedicated function keys
- Enlarged "Return" and "Shift" key
- Positive feel keys
- Low Profile Design, DIN standard
- Separate Numeric and Cursor control keypads
- Additional Functions: Key-in-Lock, Audio Beep, Previous Word, Next Word, Fast Repeat, Line Feed, Pause, Reset, Clear Screen.

Cat. X12022. only \$109

**768K MULTIFUNCTION  
I/O CARD**

(Includes cable but not 41256 RAM)

- Serial port
- Parallel port
- Games port
- Clock/Calendar with battery back-up
- provision for second serial port

Cat. X18050 ..... \$194

**MULTI SERIAL CARD**

- 4 RS232C asynchronous communication serial ports. One fitted 3 optional.
- NS16450 Asynchronous communication elements (ACE)
- COM1/COM2 COMPATIBLE
- DTE/DCE Selectable
- Drive support for PC\*/AT\*. XENIX\*
- Interactive installation procedure available.

X18154 ..... \$139

**16 BIT FLOPPY DISK DRIVE  
CONTROLLER CARD**

These cards will control up to 2 or 4 double sided 360K IBM\* compatible disk drives.

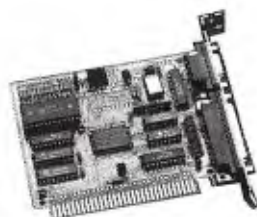
X18005 (2 Drives)...\$52

X18006 (4 Drives)...\$55

**FLOPPY DISK DRIVE  
CONTROLLER CARD**

- Supports 1-44MB, 1-2MB, /20K, 360K
- PC\*/XT\*/AT\* compatible
- 5 1/4" and 3 1/2" drives

X18009 ..... \$139

**GRAPHICS CARD**

- Hercules compatible
- Interface to TTL monochrome monitor
- One Centronics parallel printer port
- 2K-Static RAM, 64K Dynamic RAM
- Display Mode: 720 dots x 348 lines

Cat. X18003 ..... \$139

**COLOUR GRAPHICS CARD**

This card plugs straight into I/O slot and gives RGB or composite video in monochrome to a monitor.

Colour graphics: 320 dots x 200 lines.  
Mono graphics: 640 dots x 200 lines.

Cat. X18002 ..... \$99

**ENHANCED GRAPHICS  
ADAPTOR CARD**

- 256K display RAM
- Handles monochrome, CGA Hercules and E.G.A.
- Paradise\* compatible
- Up to 16 colours
- Standards: 320 x 200, 640 x 200, 640 x 348, and 720 x 348.

X18070 ..... \$330;

**COLOUR GRAPHICS  
& PRINTER CARD**

This combination card features printer and monitor interface. It has 1 parallel printer port, RGB CTTC outputs.

**Colour:**

Text Mode: 40 columns x 25 rows.  
Graphics: 320 x 200

**Monochrome:**

Text Mode: 80 columns x 25 rows.  
Graphics: 640 x 200

Cat. X18010 ..... \$99

**PRINTER CARD**

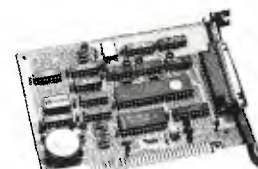
This card features a parallel interface for Centronics printers. Included is printer data port, printer control port, and printer status port.

Cat. X18017 ..... \$29

**DTC HARD DISK  
CONTROLLER CARDS**

X18060 (XT) ..... \$190

X18140 (AT) ..... \$290

**RS232 & CLOCK CARD  
(WITHOUT CABLE)**

This RS232 card supports 2 asynchronous communication ports. Programmable baud rate generator allows operation from 50 baud to 9600 baud. Fully buffered. Clock includes battery back-up and software.

Cat. X18028 ..... \$89

**RS232 (SERIAL) CARD**

This RS232 card supports 2 asynchronous communication ports. Programmable baud rate generator allows operation from 50 baud to 9600 baud. Fully buffered. Second serial port is optional.

Cat. X18026 ..... \$49

**CLOCK CARD**

Complete clock card including battery back-up and software

Cat. X18024 ..... \$55

**GAMES I/O CARD**

Features two joystick ports. (DB15).

Cat. X18019 ..... \$29

**I/O PLUS CARD**

Provides a serial port, a parallel port and a joystick port, and even a clock/calendar with battery backup!

Cat. X18045 ..... \$119

**512K RAM CARD  
(SHORT SLOT)**

- 512K memory
- User selectable from 64K to 512K
- DIP switches to start address

X18013 Without RAM ..... \$99

X18014 With RAM ..... \$459

**2 M/BYTE RAM CARD**

Plugs straight into BUS ports on motherboard. XT\* compatible. RAM not included.

X18052 (Excluding RAM)... \$194





## IBM\* XT\* COMPATIBLE COMPUTERS FROM \$895

Check these features and our prices. They're exceptional value for money!

- Final assembling and testing in Australia!
- Fast 8MHz TURBO Motherboard
- AT\* style keyboard
- Tested by us for 24 hours prior to delivery!
- 8 Slot motherboard
- 12 months warranty!
- 150W power supply

### \* \$895 COMPATIBLE COMPUTER

256K RAM Single Drive, Graphics and Disk Controller Card. .... \$895

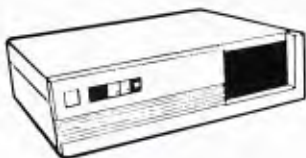
### 640K RAM TURBO COMPATIBLE COMPUTER

2 x 360K Disk Drives, Multifunction Card, Colour Graphics, Disk Controller, 1 Serial, Parallel Port. (Includes Timer Disk). \$1,095

WITH 20 M/BYTE HARD DISK:  
& single 360K Floppy Disk Drive...\$1,395  
& dual 360K Floppy Disk Drives...\$1,595

WITH 40 M/BYTE HARD DISK:  
& single 360K Floppy Disk Drive...\$1,595  
& dual 360K Floppy Disk Drives...\$1,795

WITH 80 M/BYTE HARD DISK:  
& single 360K Floppy Disk Drive...\$3,795  
& dual 360K Floppy Disk Drives...\$3,995



### IBM\* XT\* COMPATIBLE CASE AT\* STYLING

Now you can have the latest AT\* styling in a XT\* size case. Features security key switch, 8 slots, and mounting accessories. Size: 490(W) x 145(H) x 400(D)

Cat. X11091 ..... \$99



### IBM\* XT\* COMPATIBLE CASE

XT\* size and styling. Features security key switch, 8 slots, and mounting accessories. Size: 490(W) x 390(D) x 140(H)

Cat. X11090 ..... \$89



## BABY AT\* COMPATIBLE COMPUTER! FROM \$1,895

- Final assembling and testing in Australia!
- 1 M/Byte Main Board
- Switchable 8/10/12 MHz
- 1.2 M/Byte Floppy Disk Drive
- 80286 CPU
- Colour Graphics Display Card
- 8 Slots
- Floppy & Hard Disk Controller
- Printer Card and RS232
- Keyboard
- 200W Power Supply
- Manual
- 6 Months Warranty
- Size: 360(W) x 175(H) x 405(D)mm

SHORT BABY AT\* 512K RAM... \$1,895

STANDARD BABY AT\* 640K RAM,  
hard disk drive...  
WITH 20 M/BYTE HARD DISK ..... \$2,195  
WITH 40 M/BYTE HARD DISK ..... \$2,395  
WITH 80 M/BYTE HARD DISK ..... \$3,795



MAIL ORDER HOTLINE  
008 335757  
(TOLL FREE)  
LOCAL: 543 7877



### 20 M/BYTE HARD DISK

Tandon, including DTC controller card, 12 month warranty. IBM\* compatible. X20010 .. ONLY \$495

### 42 M/BYTE HARD DISK

Miniscribe, 12 month warranty. IBM\* compatible. 42 M/Byte formatted, 50 M/Byte unformatted.

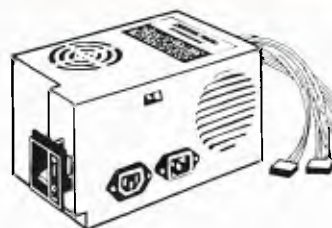
Excluding Controller ..... \$595  
Including Controller ..... \$695

### 80 M/BYTE HARD DISK

Seagate, 12 month warranty. IBM\* compatible.

Excluding Controller Please call

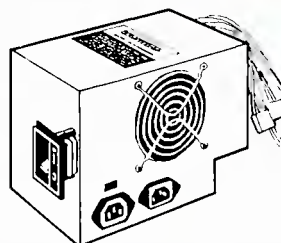
# BREAKING THE PRICE BARRIER!



### 150W SWITCH MODE POWER SUPPLY FOR IBM\* PC\*XT\* & COMPATIBLE

DC OUTPUT: +5/13A, -5V/0.5A  
+12V/4.5A -12V/0.5A

Cat. X11096 ..... \$129



### 200W SWITCH MODE POWER SUPPLY FOR IBM\* AT\* & COMPATIBLE

DC OUTPUT: +5/16A, -5V/0.5A  
+12V/5A -12V/0.5A

Cat. X11097 ..... \$199



### 180W SWITCH MODE POWER SUPPLY FOR BABY AT\* COMPATIBLES

Cat. X11098 ..... \$199



### BABY AT\* STYLE COMPUTER CASING

Our latest computer casing, featuring security key switch, 8 slots, and mounting accessories etc.

Size: 360(W) x 175(H) x 405(D)  
Cat. X11093 ONLY \$99



### 8087 CHIPS

GENUINE INTEL CHIPS WITH MANUAL AND DATA SHEETS PACKED IN BOXES

|                  |        |
|------------------|--------|
| 8087-3 (4.77MHz) | \$195  |
| 8087-2 (8MHz)    | \$295  |
| 8087-1 (10MHz)   | \$395  |
| 80287-6 (6MHz)   | \$349  |
| 80287-8 (8MHz)   | \$499  |
| 80287-10 (10MHz) | \$549  |
| 80387-16 (16MHz) | \$899  |
| 80387-20 (20MHz) | \$1499 |
| 80387-25 (25MHz) | \$1799 |

# rie ROD IRVING ELECTRONICS

MELBOURNE: 48 A Beckett St.  
Phone (03) 663 6151

NORTHCOTE: 425 High St.  
Phone (03) 489 8866

SYDNEY: 74 Parramatta Rd, Stanmore  
Phone (02) 519 3134  
Fax (02) 516 3671

CLAYTON: 56 Renver Rd.  
Phone (03) 543 7877

### MAIL ORDER & CORRESPONDENCE:

P.O. Box 620, CLAYTON 3168  
Mail Order Hotline: 008 33 5757  
(Toll free, strictly orders only)  
Inquiries: (03) 543 7877  
Telex: AA 151938  
Fax: (03) 543 2648



MAIL ORDER HOTLINE  
008 335757  
(TOLL FREE)

(STRICTLY ORDERS ONLY)

LOCAL ORDERS  
& INQUIRIES  
(03) 543 7877

### POSTAGE RATES:

|                |        |
|----------------|--------|
| \$1 - \$9.99   | \$2.00 |
| \$10 - \$24.99 | \$3.00 |
| \$25 - \$49.99 | \$4.00 |
| \$50 - \$99.99 | \$5.00 |
| \$100 plus     | \$7.50 |

The above postage rates are for basic postage only. Road Freight, bulky and fragile items will be charged at different rates.

Errors and omissions excepted.  
Prices and specifications subject to change  
IBM, PC, XT, AT, are registered trademarks of International Business Machines. Apple is a registered trademark.  
\*Denotes registered trademarks of their respective owners







# IPL provides the world's best back-up



At IPL we've always known the importance of back-up in the peripherals market.

And now we're backing up with the world's best in Tape Back-up Drives and Storage products.

Wangtek and Tecmar are the leading Tape Back-up and Storage people not only in the giant US market but worldwide. With these brands IPL are able to provide a complete

range of premium quality, higher performance Tape Back-up and Storage products, with 40, 60, 125 and 150 megabyte drives suitable for the IBM PC XT/AT, PS/2 and Apple Macintosh.

Call IPL today for more information about Wangtek and Tecmar or any of our range of computer peripherals.



Distributed by IPL-DATRON PTY LTD HEAD OFFICE 19-25 Wyndham Street, Alexandria NSW 2015 Tel (02) 698 8211  
MELBOURNE 25 Palmerston Crescent, South Melbourne VIC 3205 Tel. (03) 690 9855 BRISBANE 32 Railway Terrace, Milton QLD 4064 Tel: (07) 368 3292

# CALCULATIONS

representations (or adhere to those of some other commercial numerics library). Perhaps you don't need a 64-bit mantissa's worth of accuracy — you'd prefer handling lots of less-precise numbers quickly, rather than take more time for a few really precise ones. In this case, you can lop bytes off the mantissa from the right — but keep in mind that for every bit you give up in the mantissa, you lose about one-third of a decimal digit's worth of accuracy. If you want to store the exponent in a byte rather than a word, you'll certainly have to pick a smaller bias value (128 comes to mind, since that number divides a byte's range: 0 to 255) and write some routines for translating to and from byte-wide and word-wide exponents.

## Incoming

Getting a floating-point number into the package from the outside — typed in from the keyboard or read from a file — simply requires a routine to read a character string representing a floating-point number and translate that number into the package's internal representation. You can break this requirement down further into a series of simpler requirements: the routine must read and translate signs (+ or -), a mantissa and an exponent.

The routine I've provided reads a character string whose format can handle any floating-point number that the package is capable of handling. I haven't built a great deal of flexibility into the input routine — it likes its strings just so — but I'll point out places where you should have no problem extending the software to handle freer entry formats. While I'm on the subject of formats, here's the format that my input routine expects:

`sD.DDDDEsDDD<null>`

where s is a sign (+ or -), D is a digit (0 to 9), <null> is the null character (ASCII 0), '.' is a decimal point, and E is E (which signals that the exponent portion follows). If you've done any engineering or scientific programming, you'll feel right at home with this format. You can see that a number is written as the sign of the mantissa, followed by the mantissa, followed by E, followed by the sign of the exponent, followed by the exponent. As I mentioned before, my input routine is fairly inflexible, so none of this is optional. You must write 1 as +1.0E+0; 5000 as +5.0E+3; -.0045 as -4.5E-3; and so on.

Listing 2 shows the pseudocode for the input routine. NextCHAR is a fictitious function that returns the next character from the input string (in the actual code,

```
LDFACC:
  (Assumes SI points to number, DI points to _SIGN field of
  the floating-point accumulator to store.)

  (Set the sign field)
  Set byte at [DI] based on high bit of byte at [SI];

  Move the number into the accumulator;
  Clear lowmost word of mantissa;
  Clear highmost bit of exponent;
  Shift mantissa right 1 bit;
  RETURN;

STFAC1:
  (Assumes DI register points to destination.)

  Shift FAC1_MAN left 1 bit;
  IF FAC1_SIGN = 0 THEN FAC1_EXP = FAC1_EXP AND 7FFFH;
  ELSE
    FAC1_EXP = FAC1_EXP OR 8000H;
  Move the number out of FAC1, exponent first, followed by
  the top 4 words of the mantissa; (Since FAC1_EXP and
  FAC1_MAN are contiguous, this uses an REP MOVSW
  instruction.)
  RETURN;
```

*Listing 1 Pseudocode for the LDFACC and STFAC1 routines that move numbers to and from the floating-point accumulators*

```
FPINPUT:
  CH = NextCHAR;
  IF CH = '+' THEN FAC1_SIGN=0; ELSE FAC1_SIGN=128;
  DEC EXP=0;
  FAC1_MAN=0;
  CH = NextCHAR;
  CALL ADDDIGIT(CH);
  CH = NextCHAR; (Skip decimal point)
  REPEAT
    BEGIN
      CH = NextCHAR;
      IF CH is not a digit THEN GOTO FPI1;
      CALL ADDDIGIT(CH);
      DEC EXP=DEC EXP-1;
    END
  FPI1:
  (The next line skips the "E" and reads the exponent sign.)
  CH = NextCHAR;
  IF CH = '+' THEN EXP_SIGN=0; ELSE EXP_SIGN=128;
  EXP_VAL=0;
  REPEAT
    BEGIN
      CH = NextCHAR;
      IF CH is not a digit THEN GOTO FPI2;
      EXP_VAL = 10 * EXP_VAL + VALUE(CH);
    END
  FPI2:
  IF EXP_SIGN = 0 THEN
    DEC_EXP = DEC_EXP + EXP_VAL;
  ELSE
    DEC_EXP = DEC_EXP - EXP_VAL;
  FAC1_EXP=BIAS+79;
  CALL NORM1;
  FAC2 = 10.0
  IF DEC_EXP > 0 THEN
    REPEAT DEC_EXP TIMES
      CALL FPMULT;
  IF DEC_EXP < 0 THEN
    REPEAT ABS(DEC_EXP) TIMES
```

*continued...*

*Listing 2 Inputting a floating-point number*



# Has George Gone MAD?



## No, he just won't be undersold on Quality EPSON COMPUTERS & PRINTERS!

Check our low prices on these wonderful EPSON Computers and printers, but don't buy on price alone, you'll love our Service and personal Attention.

George Weiss the founder of George's Camera Store, now is Dakomm Computers.

**Your Satisfaction is Guaranteed!**

### EPSON AX2



High quality 12 MHz computer from Japan. 640K of RAM, 1.2MB floppy disk drive, 20 MB Hard disk, Ms-Dos 3.3, GW-Basic, superb 101 Keyboard, Mono Graphic card and Monitor

**Only \$3495.00**

Also available with EGA, PGA and VGA cards and Monitors with 20, 40, 44 and 71 MB Hard Disks.

Individual Prices on application. Here are some samples:

40 MB VGA under \$5000

71MB vc. Mono under \$5000

71MB vc VGA under \$6000

### Epson AX

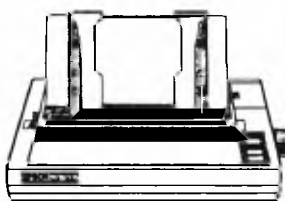


This superb computer is an ideal File Server. Apart from all the features of AX2 it has a large footprint with plenty of room for 5 devices (disk drives), 3x8 bit and 6x16 expansion slots, with 71 MB voice coil Hard disk, Ms-Dos 3.3, GW-Basic, Deluxe 101 Keyboard, EGA card and Monitor.

**under \$6000**

Many other combinations are available, call for your price.

### EPSON LQ-500



24 pin dot matrix printer, 180 c.p.s. in draft 60 cps in Letter quality. Complete with tractor feed.

**Amazing Value \$639**

### EPSON PCe



High quality XT type FAST 10 MHz computer with 640K of RAM, front panel controls, delightful 101 Keyboard, Ms-Dos 3.3, GW-Basic available in the following combinations:

**Mono Graphic card and Monitor;**

twin floppies **\$2195**

30MB hard disk **\$2695**

**EGA card and Monitor:**

twin floppies **\$2895**

30 MB hard disk **\$3395**

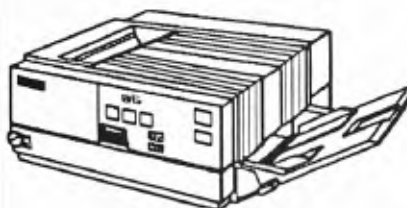
**VGA card and Monitor:**

twin floppies **\$3195**

30 MB hard disk **\$3695**

### LASER PRINTER BREAKTHROUGH!

Price is no longer an Excuse for poor quality letters



EPSON GQ-3500 laser printer is a six pages per minute 300x300 dot per inch high quality printer with 7 built-in fonts. Has options of extra Memory, Emulation and font cards. This low price makes it attractive not only for Desktop-publishing, but

because it's silent and fast, it is now a must for the office. One GQ-3500 can handle the work of several (6) secretaries.

**Now only \$2695**

### EPSON PC Portable



True Laptop computer weighs only 6 kgs with latest Super twisted backlit LCD screen, V30 chip runs at 4.77 and 10 MHz. Full Keyboard. 3.5" floppy disk drive and 20 MB hard disk. Ms-dos 3.3, GW-Basic, runs on Battery or mains. Complete with carrying case.

**A limited number available at this crazy price \$3995**

### EPSON PRINTERS.

|         |           |
|---------|-----------|
| LX-800  | EX-800    |
| EX-1000 | FX-850    |
| FX-1050 | LQ-500    |
| LQ-850  | LQ-1050   |
| SQ-2500 | LQ-2500 + |
| LQ-2550 | GQ-3500   |

We stock not only the full range of Epson printers, but all consumables as well, ribbons, cartridges, etc.

**NEW! LATEST! NEW!**

### dBASE IV

The latest from Ashton-Tate it has everything that opens and shuts. Built-in compiler making it run 10x faster than dBase III, SQL programming language, 310 new commands, yet is compatible with dBase III. Application Generator, Forms Manager, Report Writer for ease of use. New "Control Center" for those who don't want to program.

Introductory Price

**only \$895**

# DAKOMM

**PTY. LIMITED**

**44 PARK STREET SYDNEY 2000**

**Fax: (02) 264 7852**

**(Opposite Park Regis)**

**Phone: (02) 264 9188**

### Ultra AT from Imagineering with 10MHz 1MB RAM

1.2 MB FDD,  
Ms-Dos 3.3,  
GW-Basic,  
101 Keyboard. 12 Months Guar-  
antee, with 40 MB Hard disk, VGA  
card and VGA Colour Monitor Was  
\$4395.00

**Sale \$4195.00**

With 40 MB Hard Disk EGA card  
and EGA Colour Monitor. Was  
\$4095.00

**Sale \$3750.00**

With 40 MB Hard Disk Mono  
Graphic card and Monitor. Was  
\$3395

**Sale \$3095.00**

Imagineering

### ULTRA TURBO XT

with 640 K 10  
MHz, 360 K  
FDD, 30 MB  
Hard Disk, Ms-Dos 3.3, GW-Basic,  
101 Keyboard VGA Card and VGA  
Colour Monitor. Was \$3395.00

**Sale \$3150**

With 30 MB Hard Disk EGA card  
and EGA Colour Monitor. Was  
\$3095.00

**Sale \$2795**

With 30 MB Hard Disk Mono  
Graphic card and Monitor

**Sale \$1995**

### OTHER BARGAINS:

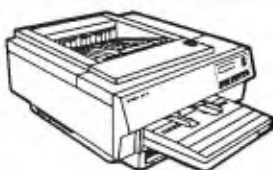
|                                |         |
|--------------------------------|---------|
| VGA Card                       | \$575   |
| EGA Card                       | \$299   |
| Eizo 3030 12" Monitor          | \$195   |
| ADI 14" EGA                    | \$749   |
| ADI VGA 14" VGA                | \$795   |
| Dual Fr. 12" Mono Monitor      | \$179   |
| INTEL 80287-10                 | \$525   |
| Plus Hardcard 20 MB            | \$1100  |
| Plus Hardcard 40 MB            | \$1295  |
| Mouse good Quality             | \$79.95 |
| Microsoft Mouse                | \$229   |
| Logitech Mouse                 | \$179   |
| Ultra 9 pin dot matrix printer | \$375   |
| Star NX-1000 printer           | \$469   |

### Multi-User Networking

### Office Automation

Let us quote you from simple  
2 screen small business to  
large hundreds of nodes  
solutions.

### SPECIAL OFFERS! HP LASERJET Series II



Hewlett Packard Laserjet Series II  
with 512 K + 2 MB extra RAM.  
Was \$6695.00

few only at **\$4795.00**

### HP SCANJET

HP Scanner complete with PC in-  
terface and Scanning Gallery,  
was \$4400.00

few only at **\$2495.00**

### Laptop Bargain of the Year!



Super  
Fast  
Japanese  
286 Lap-  
top 640 K  
RAM 10  
MHz, 3.5" FDD of 1.2 MB, 20 MB  
Hard disk, EGA and CGA com-  
patible Gas-Plasma Screen,  
weight 6.4 kg. Was \$5995.00

A few only at **\$4995.00**

### FAX CARD.

Convert your computer  
into a Fax. Easy to install,  
easy to use. Ideal for  
faxing all your customers  
with Special offers at  
night.

under **\$1000**

### AT's DON'T NEED 360 KB DRIVES!

The 1.2 MB drive has long been  
known to READ, but not reliably  
WRITE on 360 KB floppies. With  
CPYAT2PC 1.2 MB drives CAN  
reliably WRITE 360 KB floppies,  
saving a slot for a second hard disk  
or tape backup.

### CPYAT2P

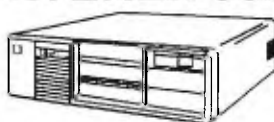
#### SOFTWARE SOLUTION!

- Not Copy Protected
- No software or hardware  
modification
- A 360 K Drive not required
- "CPYAT2PC" resides on  
hard disk
- Runs on IBM AT and com-  
patibles
- Can even Split files bigger  
than 360K

**Only \$153 + \$5.00 P/P**

**Tax Free \$135 + \$5.00 P/P**  
**Dealer inquiries invited.**

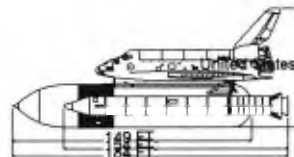
### EVEREX 386



We have a limited number of these  
16 MHz 386 American made Com-  
puters in our Sale. 1 MB of RAM,  
1.2 MB Floppy Disk Drive, 40 MB  
Hard Disk, 101 Keyboard, Mono  
graphic card and Monitor.

**Sale \$4995**

### Watch your Designs soar! CCS Designer the Complete PC CAD package.



CCS DESIGNER comes with  
many of the same powerful  
advanced features found in  
CAD systems costing  
hundreds - even thousands  
- of dollars more. Designed  
to use with or without a  
mouse, all you need is IBM  
PC/XT/AT \*\* or compatible  
Computer with 512 K Ram  
and you'll be creating  
designs in less than 30  
minutes. Feature for feature,  
no other CAD package of-  
fers such outstanding per-  
formance with such ease of  
use.

Use it for dozens of applica-  
tions, from Architectural  
designs, Engineering to  
even pattern making for  
dresses. There are 3 Sym-  
bol libraries available.

**Easy to Use and to Learn**

**Only \$159.80**

**Tax Free \$141**

**add \$5 for P/P**

**Dealer inquiries invited.**

### The Ultimate Retail Package!

Using all my experience in retailing, we selected and helped to develop a compre-  
hensive Accounting Program. It will work on a single computer or a network. Can use a  
range of Cash-registers or a computer as a the Point-of-Sale device.

It is a complete System, Stock control, Stock-take, Price List, Sales Analysis, Point-of  
Sale as well as a complete Accounting system with Accounts receivable, Accounts  
Payable, Check writing and a full blown General Ledger. Can be used for Importing,  
Wholesaling and Distributing. Just Tailor the program to your own requirements.

**Call us for Details, let us Quote you for a full System.**  
**Dealer inquiries welcome.**

# DAKOMM

**PTY. LIMITED**

**44 PARK STREET SYDNEY 2000**  
**Fax: (02) 264 7852**

**(Opposite Park Regis)**  
**Phone: (02) 264 9188**



# CALCULATIONS

the SI register points to the input string, so the NextCHAR function is actually a LODSB instruction). Once FPIINPUT translates the sign of the mantissa, it simply grabs each mantissa digit from the input string and adds it into FAC1's mantissa. (Like the other routines in the package, this routine returns with the inputted number stored in FAC1.) As each digit is added, the routine treats FAC1\_MAN not as a binary fraction but as a large binary integer. In effect, the routine ignores the decimal place; it remembers where it is by counting how many digits appear to the right of the decimal point. This value is kept in DEC\_EXP.

Next, the routine reads the exponent sign and exponent value. This process is a miniature version of what's just gone on in the mantissa. For the exponent: get a digit, multiply the accumulated exponent value by 10, add the new digit in and repeat. Once the routine has successfully converted the ASCII exponent to binary, it adds that amount into DEC\_EXP.

Now it's a cleanup job. The routine has all the numbers it needs. First, it normalises the contents of FAC1\_MAN. Notice the value loaded into FAC1\_EXP prior to normalisation to reflect the fact that the number in the mantissa is an integer — that is, that the binary point is to the right of the least significant bit. Then the routine loads a floating-point 10.0 into FAC2 and, depending on the sign of DEC\_EXP, either multiplies or divides FAC1 repeatedly by 10.

You now have a binary floating-point number in FAC1.

My routine requires one digit to the left of the decimal point. Modifying the algorithm to accept any number of digits to the decimal point's left should be trivial. It would also be simple to recode things so

```
CALL FPDIV;
RETURN;

ADDIGIT:
CALL FAC1x10;
FAC1_MAN = FAC1_MAN + VALUE(CH);
RETURN;

FAC1x10:
(This routine multiplies FAC1's mantissa by 10 using
the identity 10*x=8*x+2*x.)
Shift FAC1_MAN left 1 bit;
FAC3_MAN = FAC1_MAN;
Shift FAC1_MAN left 2 bits;
FAC1_MAN = FAC1_MAN + FAC3_MAN;
RETURN;
```

end

that signs are not required; no sign would indicate an implied plus sign. Finally, you could have the routine assume a zero exponent if it encountered the end of the string before running into an E.

## Outgoing

Once you've done various complicated floating-point calculations, you need a way to examine the results of your cipherings. You need the reverse of the input routine: something to convert a floating-point number to an ASCII character string (see Listing 3).

The output algorithm works like this: remember that the internal representation of the floating-point numbers is in base two, so we need to somehow extract the base-10 exponent portion of the number. We already know the internal representation for 10.0 (we used that in our input routine), so we can perform a series of multiplications or divisions by 10 until the number falls somewhere between one and 16. You can tell when the number is in this range by watching the exponent (in this case, FAC1\_EXP

minus the bias amount), which tells you how many digit positions the binary point is from the number's most significant bit. For example, if FAC1\_EXP = BIAS + 5, you know the number looks like bbbbbb.bbbbbb... (where b is a bit, 1 or 0). If FAC1\_EXP = BIAS - 2, the number looks like this: 0.00bbbbbbbbb... (where the leftmost b is the most significant digit).

Each time the routine performs a multiplication (or a division) by 10, it increments (or decrements) DEC\_EXP. In this way, the routine determines the number's base-10 exponent.

The routine's next step is to narrow the number's range even further by verifying that it is between one and 10. If the number is greater than 10 (it cannot be less than one because of what the routine has done to the number so far), FPOUTPUT does one more division by 10. Now the routine adjusts the number so that the binary point is between bits 75 and 76, and the top four bits of the number are its integer portion. And thanks to all the multiplying and dividing by 10 that's gone on, we know that the integer por-



# XTRATEK

CORPORATION PTY LTD  
109 WELLINGTON STREET  
WINDSOR, VIC. 3181

Importers &  
Wholesalers of  
Computer Components &  
Accessory Products

Tel: (03) 521 1249 or (03) 525 1836  
Facsimile: (03) 525 1836

**Bulk Dealer Supplies or  
Single Unit Orders Welcome  
at Dealer Prices**

## QUALITY COMPUTER COMPONENTS

### FULL RANGE of INTERFACE BOARDS

- MULTIFUNCTION CARDS
- SERIAL PORTS
- PRINTER PORT CARDS
- VIDEO GRAPHIC CARDS
- RAM CARDS
- EMS MEMORY BOARDS
- PS/2 CARDS
- 286 XT Accelerator Card
- EGA Cards
- MOTHER BOARDS

### ACCESSORIES

- Data Switch Boxes
- Extended Key Boards
- Monitor ARM's

### RAM TESTERS

### XTRA EXTERNAL FLOPPY DRIVES

- 5.25" & 3.5" for PS/2 & XT or AT's
- 4 Drive Controllers for XT & AT
- Hard Disk Controllers
- Hard Card Mounting Frames
- U.F.C. Floppy Controllers, controls ALL FD types - \$156

### CALL FOR PRODUCT CATALOGUE WHOLESALE PRICES

We Supply Dealers and OEMs  
**(03) 521 1249**  
**(03) 525 1064**

### TOP RODENT GENIUS MOUSE PLUS

Dr Halo III & 20  
pop-up Menu's for  
major software  
programs **PLUS**  
Mouse Holder & Pad  
**\$135**

### INDUSTRIAL & LAB PRODUCTS

- IEEE Cards
- Data Acquisition Cards
- Controller Cards
- Data Analysis Software
- Unkelscope Software
- "Oscilloscope on a Computer"

# YOU CAN KILL A RHINOCEROS WITH A PENKNIFE . . . .



But it would take a long time. You can develop your database by using the conventional cumbersome database packages. But that too would take a long time.

You would think that by now, somebody would have designed a package that would store, retrieve and manipulate your records, laid out exactly the way you would like them, without the need for lengthy and expensive analysis and development.

## WELL THEY HAVE

Moreover it is a package that has over 20,000 users . . . .

. . . . A package that your staff could be given in the morning and will be using effectively by lunchtime without the need for installation or training.

. . . . A package that uses short concise commands - no tiresome, lengthy syntax, command files or further menus just to perform a simple task.

. . . . A package that can be used on PC's and networks, and is advanced enough to genuinely take full advantage of OS/2™ technology and not just the "DOS compatibility box" within the OS/2™ operating system.

. . . . A package that is used by the London Metropolitan Police Force, major Australian shipping and finance companies, government organisations such as the Victorian Museum, even the World Health Organisation to maintain their records - up to 500,000 of them in a single file.

The best selling card-indexing and mailing system in Europe is now distributed and supported in Australia.

## CARDBOX-PLUS VERSION 4.0®

There is no faster, more flexible way of storing, retrieving or sorting data than Cardbox-Plus Version 4.0®.

There is no simpler way to create highly personalised letters, sort and send those letters to targeted selections of records, than with Cardbox-Plus Version 4.0®.

There is no quicker way of receiving information on Cardbox-Plus Version 4.0® than by sending this coupon or calling Reckon on (02) 371 9222

Please send me more information on Cardbox-Plus Vn 4.0®

NAME .....

COMPANY NAME .....

PHONE NUMBER .....

ADDRESS .....

..... POSTCODE .....

RECKON SOFTWARE PUBLISHERS PTY LTD  
706 NEW SOUTH HEAD ROAD  
ROSE BAY NSW 2029

APC NOV

**RECKON**  
SOFTWARE PUBLISHERS & DISTRIBUTORS

©Business Simulation  
™Microsoft Pty. Ltd.



It's finally out in the open.

Novell's diskless PC Terminal is actually made by Hyundai, the \$20 billion Korean giant.

Now you can get your PC Terminal direct from your Hyundai dealer only the label has been changed on this designer original. Otherwise this is the very same PC Terminal, co-design by Novell, that you've been successfully using. Tested and approved by Novell to be 100% compatible with Novell Netware:

Actually, it's better than the original Novell PC Terminal. Because it now comes at a lower recommended price than the original. And we've added an important new feature. An 12-month warranty. Something to give you real PC of mind. Just the kind of support you'd expect from a world class, worldwide giant corporation like Hyundai.

In addition to Novell-approved



PC Terminals, we can also offer you a wide range of LAN products. Like our Super 16TE. And our small footprint AT-compatible Super 286C.

Call Datamatic DP now for the name of your nearest Hyundai dealer. While you're at it, ask about our other Hyundai and LAN products.

You'll find it quite a revelation.

# Major cover-up is exposed.



 **HYUNDAI**

Sydney (02) 488 8066  
Melbourne (03) 596 7455  
Canberra (062) 80 5033

Brisbane (07) 854 1500  
Adelaide (08) 363 1833  
Perth (09) 382 2066

Your Connectivity Company

***DATAMATIC***

*Datamatic DP Pty Limited*

## CALCULATIONS

tion of the number must be between one and 10 — that is, a single decimal digit.

The rest of the job is a snap. Since you've isolated your first digit in the top four bits, you simply strip those bits out, convert binary to ASCII, and output the character. Then you multiply the mantissa by 10, strip the top four bits out again, and keep up the process until you have however many digits you need. (Warning: do not use the package's FPMULT

routine to do this multiplication, since FPMULT exits through the normalisation routine, which would reset the binary point. Instead, you should use the fact that  $10 \times x = 2 \times x + 8 \times x$  and implement the multiplication as a series of shifts and adds. Check out the pseudocode for routine FAC1  $\times$  10.) The decimal exponent portion is waiting for you in DEC\_EXP, so just output it using an integer-to-ASCII routine (the details of

```
FPOUTPUT:
DEC EXP=0;
IF FAC1_EXP=0 THEN GOTO FOUT1;
FAC2=10.0;

(Note: The comparisons in the following two WHILE
statements treat FAC1 as a positive number.)
WHILE FAC1 > 15
BEGIN
CALL FPDIV;
DEC EXP=DEC EXP+1;
END
WHILE FAC1 < 1
BEGIN
CALL FPMULT;
DEC EXP=DEC EXP-1;
END

IF FAC1>=10 THEN
BEGIN
CALL FPDIV;
DEC EXP=DEC EXP+1;
END

(Set binary point between bits 75 and 76.)
IF FAC1_EXP=BIAS+4 THEN
Shift FAC1_MAN left 1 bit;
ELSE
WHILE FAC1_EXP < BIAS+3
BEGIN
Shift FAC1_MAN right 1 bit;
FAC1_EXP=FAC1_EXP+1;
END

ROUND FAC1_MAN;

FOUT1:
IF FAC1_SIGN = 0 THEN OUTPUT('+');
ELSE
OUTPUT('-');
CH = Leftmost nibble of FAC1_MAN;
OUTPUT(ASCII(CH));
OUTPUT('.');
REPEAT N TIMES
BEGIN
Clear leftmost nibble of FAC1_MAN;
CALL FAC1x10;
CH = leftmost nibble of FAC1_MAN;
OUTPUT(ASCII(CH));
END
OUTPUT('E');
IF DEC_EXP>=0 THEN OUTPUT('+');
ELSE
OUTPUT('-');
OUTPUT(Integer to ASCII (ABS (DEC_EXP)));

RETURN
```

Listing 3 Pseudocode for the floating-point output routine

## HELP FOR ALL PROGRAMMERS

*You can now create sophisticated applications **FAST** with our compilers, database and windowing libraries, editors and tools.*

*Convert your dBASE programs to C with **dBx** and watch them run like lightning under MS-DOS, Unix, VMS etc.*

*Use **c-tree** and **r-tree**, the **BEST** multiuser database and multi-file report generator. Faster than C-ISAM and Btrieve. With full C source.*

***DON'T** re-invent the wheel. You need **Blaise** general, comms and graphics libraries with full C source.*

***FULL RANGE** of products including Microsoft C, QuickC, Turbo C, DeSmet, Hitech, Turbo Pascal, MicroFocus COBOL, Microport Unix, Wendin DOS/XTC/OST, PC-Lint, c-terp, and more.*

Mail this coupon to receive your **FREE** Programmer's Catalogue Disk MS-DOS 5.25"

Name .....

Address .....

.....p/c.....



**MICROMART PTY. LTD.**  
GPO Box 1579, Sydney 2001  
Phone: 214-2853 24 hours



## CALCULATIONS

which I won't go over here, since there are plenty of sources for such algorithms), and you're all done.

The only thing I've glossed over is rounding (the pseudocode shows it as ROUND FAC1\_MAN). There are various ways you can go about rounding the number for output; the choice depends on what sort of accuracy you're looking for. If you modify FPOUTPUT to be part of some formatted numeric output package, you'll have to add code to determine which digit to round on. This will depend on how many digits a particular calling routine requests to output. My maths package's output routine simply adds  $5 \times 10^{-19}$  to the number in the mantissa since, as I said earlier, a 64-bit mantissa gives about 19 digits of accuracy. (It does this by adding 9393 hexadecimal to the least significant word of FAC1\_MAN and rippling any carries on up the rest of the mantissa.)

### Left as an exercise

Carnivorous floating-point addicts may want to extend the package even further. This is understandable; there are plenty of functions involving floating-point numbers that I haven't covered here. Some of the more esoteric are beyond what I

have room to present. Other, more recognisable functions are quite easy to implement:

- **Integer-to-floating-point** The clue to this is hidden in the floating-point input routine. First, you check the sign of the integer, store that in FAC1\_SIGN, and, if it is negative, convert the integer to a positive number. You move the integer into FAC1\_MAN — right-justified, so that the low word of the integer is in the rightmost word of FAC1\_MAN. Then you load FAC1\_EXP with the value BIAS+79 and call the normalisation routine.

- **Floating-point-to-integer** Load the number into FAC1 using LDFACC and examine FAC1\_EXP. If FAC1\_EXP is less than or equal to BIAS, forget it — the number has no integer part. Otherwise, FAC1\_EXP - BIAS tells you how many bits, starting with bit 78 and moving to the right, are the integer portion. For example, if FAC1\_EXP - BIAS = 5, then bits 78 to 74 form the integer (with bit 78 being most significant). Do a looping shift operation and a final check with FAC1\_SIGN to see if you have to negate things, and you're there.

- **Floating-point comparisons** Comparison operations — greater than, less than, equal to, and so on — are easily

done using the floating-point subtract routine (FPSUB) and checking the sign of the result.

Of course, there are other routines that are even simpler. To take the absolute value of a floating-point number, you simply clear the sign bit. To change a floating-point number's sign, you do an exclusive-OR operation on the sign bit. You can perform these functions without even moving the number into the accumulator. Then there are the tough routines, such as trigonometric and transcendental functions. You can handle these by applying either interpolation to lookup tables (if you have lots of storage and you're looking for speed) or series expansion (which is best when storage is tight and you don't mind waiting a little for your answer). For example, the series expansion for sine(x) is as follows:

$$\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \frac{x^9}{9!} \dots$$

The CRC (Chemical Rubber Company) Handbook of Standard Mathematical Tables, used by some university maths, science or engineering students, will provide you with the series expansion for more functions than you can think of.

END

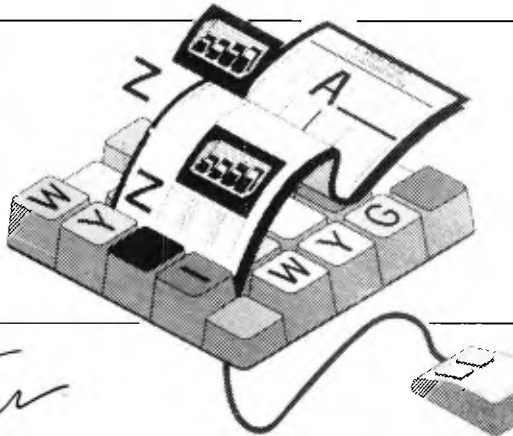
...you don't have to be a  
designer or graphic artist  
to use a...GEM

☐ Professional publications can be created on your personal computer easily. It's as good as having your own small print shop right at your very fingertips — without all the expense! Available now for immediate delivery at only...

**\$450**  
(excluding tax)

GEM

ANOTHER GREAT PRODUCT FROM:



DIGITAL RESEARCH

**YES!..**

... I would like to know more about the "GEM Desktop Publisher".

PLEASE SEND DETAILS:

NAME: .....

ADDRESS: .....

..... P/CODE.....

PHONE .....



RETURN TO:  
QUERCUS  
DISTRIBUTORS

159 BURBRIDGE ROAD  
HILTON, S.A. 5033  
PHONE (08) 234 1411  
FAX (08) 234 1311

# "... one of the nicest entry level PCs available!"

That's what Your Computer, Australia's leading computer magazine had to say about the Series II Acer 500+. When you consider that they see every computer on the market, it says a lot for the incredible Acer 500+.

**Here's why!** There's an Acer 500+ for just about every application and they're all exceptional value for money! Fast, powerful and with more standard features than any other computer at the price. In fact, it's the only computer that comes with our unique colour emulation software that lets you run all your CGA software on the TTL monitor in four shades of grey.

The Acer 500+ is ideal for...

- WORD PROCESSING
- EDUCATION
- BUSINESS APPLICATIONS
- FUN & GAMES



Choose a system:

## SYSTEM 1

256K memory (expandable to 640K), single disk drive, soft white monitor, real time clock, MS.Dos V3.3 software, 4.77/8MHz clock speeds...and more! Cat X-8060

**\$995**

## SYSTEM 2

All the incredible System 1 features but with 640K memory and twin floppy disk drives! Cat X-8061

**\$1495**

## SYSTEM 3

20Mb hard drive with 640K memory and single floppy disk drive. A boon for business! Cat X-8062

**\$2095**

All Acer 500+ computers come with 12 months warranty

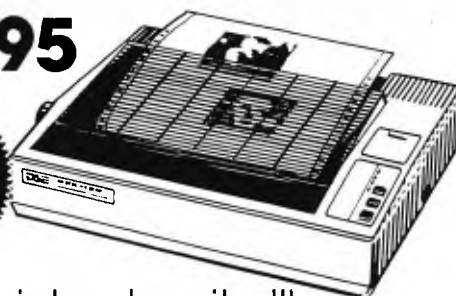


Finally it's here!

Up to 240Mb storage capacity

Hard disk backup on your VCR!

It acts just like a streaming tape drive at a fraction of the cost! You can backup all your hard disk data on a normal video tape. Just think of the time and disk swapping you'll save. A 4hr video tape will hold up to 240Mb, so you'll have all the storage capacity you need! Comes complete with slip-in circuit board for internal mounting, video tape with a large selection of public domain software, manuals...the lot! Cat X-3840



Budget printer does it all!

You'd expect to pay much, much more for a printer with these features. The DSE 135 Dot Matrix Printer gives you the choice between lightning fast speed or near letter quality. IBM graphics compatible printer with up to 135cps or near letter quality (27cps), inbuilt tractor feed, handles alpha numeric, semi graphics, bit image, paper width 101mm to 254mm and more! It even does italics! Cat X-3225

Was \$499 Now Only **\$449**

**Sensational Value! \$499**

**DICK SMITH**

**ELECTRONICS**

• NSW • Albury 21 8399 • Bankstown Square 707 4888 • Blacktown 671 7722 • Bondi Junction 387 1444 • Campbelltown (046) 27 2199 • Chateau Chase 411 1955 • Chullora 642 8922 • Gore Hill 439 5311 • Gosford 25 0235 • Hornsby 477 6833 • Liverpool 600 9888 • Maitland 33 7866 • Miranda 525 2722 • Newcastle 61 1896 • North Ryde 88 3855 • Parramatta 689 2188 • Penrith (047) 32 3400 • Railway Square 217 3777 • Sydney City 267 9111 • Tamworth 66 1711 • Warringah Mall 05 0441 • Wollongong 26 3800 • ACT • Fishwick 80 4944 • VIC • Ballarat 31 5433 • Bendigo 43 0388 • Box Hill 890 0699 • Dandenong 794 9377 • East Brighton 592 2366 • Essendon 379 7444 • Footscray 689 2055 • Frankston 783 9144 • Geelong 43 8804 • Melbourne City 326 6088 • Richmond 428 1614 • Ringwood 879 5338 • Springvale 547 0522 • QLD • Brisbane City 229 9377 • Buranda 391 6233 • Cairns 311 515 • Chermide 359 6255 • Redbank 288 5599 • Rockhampton 27 9644 • Southport 32 9863 • Toowoomba 38 4300 • Townsville 72 5722 • Underwood 341 0844 • SA • Adelaide City 232 1200 • Beverley 347 1900 • St. Marys 277 8977 • Elizabeth 255 6099 • Enfield 260 8088 • WA • Cannington 451 8666 • Fremantle 335 9733 • North Perth 328 6944 • Perth City 481 3261 • TAS • Hobart 31 0800 • NT • Stuart Park 61 1977

ORDER BY PHONE TOLL FREE (008) 22 6610 for DSXpress 24 HOUR DESPATCH.



# It's almost Christmas present time!! For your mum, your friend ... even for yourself!

## ACCESSORIES:

|                                                            |       |
|------------------------------------------------------------|-------|
| Floppy Disk Storage boxes holds 50 5.25" disks .....       | \$ 20 |
| Floppy Disk Storage boxes holds 100 5.25" disks .....      | \$ 23 |
| Floppy Disk Drive Cleaning Kit 5.25" (Non abrasive) .....  | \$ 14 |
| Mouse Pads .....                                           | \$ 15 |
| Off Desk CPU Stand .....                                   | \$ 30 |
| Printer Stand (helps stops paper jams) 15" or 10" wide ... | \$ 30 |
| Paper Baskets to suit above 15" or 10" wide .....          | \$ 20 |
| Brother 1509/1709 Ribbons .....                            | \$ 16 |
| Printer Cable IBM to Centronics 2m long .....              | \$ 24 |
| Printer Cable IBM to Centronics 3m long .....              | \$ 28 |
| Monitor Signal Extension Cable 9 pin 2m long .....         | \$ 18 |
| Monitor Power Extension Cable 9 pin 2m long .....          | \$ 15 |
| Keyboard Extension Cable 5 pin DIN connector 2m long ...   | \$ 12 |

## LOGITECH MICE AND SCANNER SUPER SPECIALS:

|                                                           |        |
|-----------------------------------------------------------|--------|
| Logitech ScanMan Hand Scanner with Software .....         | \$ 430 |
| Logitech Mouse plus Pack (Bus or Serial) .....            | \$ 159 |
| Logitech Mouse with Paint Show (Bus or Serial) .....      | \$ 199 |
| Logitech Mouse with Cadd (Bus or Serial) .....            | \$ 265 |
| Logitech Mouse with Cadd & Paint (Bus or Serial) .....    | \$ 305 |
| Logitech Mouse with First Publisher (Bus or Serial) ..... | \$ 250 |
| Logitech Hi Rez Mouse 320dpi (bus only) .....             | \$ 259 |
| Logitech PS/2 Mouse .....                                 | \$ 150 |

\*All mice come with Plus Pack Software \*Twelve months warranty \*ScanMan comes with Scanware & Paint Show software \*ScanMan is a 4.1" wide scanner  
\*Complete manuals \*Easy Installation.

## SOFTWARE: BORLAND

|                     |        |                         |        |
|---------------------|--------|-------------------------|--------|
| Paradox .....       | \$ 995 | Turbo Prolog Ver2 ..... | \$ 169 |
| Quattro .....       | \$ 290 | Turbo C Ver2 .....      | \$ 169 |
| Sprint .....        | \$ 290 | Turbo Pascal Ver5 ..... | \$ 169 |
| Sidekick .....      | \$ 110 | Turbo Debugger .....    | \$ 169 |
| Sidekick Plus ..... | \$ 290 | Turbo Assembler .....   | \$ 169 |

## LOGITECH

|                                                          |        |
|----------------------------------------------------------|--------|
| Logitech Modula-2 Compiler Ver 3.02 uses DOS linker .... | \$ 158 |
| Logitech Modula-2 Toolkit, Debugger, linker etc .....    | \$ 252 |
| Logitech Modula-2 Development System both the above ...  | \$ 360 |
| Windows Machine for above .....                          | \$ 77  |
| Logitech Modula-2 for OS/2 .....                         | \$ 525 |

## GENERAL

|                                      |        |                            |        |
|--------------------------------------|--------|----------------------------|--------|
| dBase III Plus .....                 | \$ 825 | Lotus Agenda .....         | \$ 550 |
| Q & A .....                          | \$ 520 | Norton Utilities Ver 4 ..  | \$ 125 |
| Clipper (summer 87) ...              | \$ 850 | Norton Utilities Adv ..... | \$ 185 |
| WordPerfect Ver5 .....               | \$ 590 | TimeL Proj Mgmt Ver 3 ..   | \$ 990 |
| Framework II .....                   | \$ 999 | PC Tools .....             | \$ 124 |
| Lotus 123 Ver2 .....                 | \$ 645 | MACE & Utilities .....     | \$ 165 |
| Microsoft Quick BASIC Compiler ..... | \$ 114 |                            |        |
| Microsoft Quick C Compiler .....     | \$ 114 |                            |        |

## NAKAJIMA PRINTERS:

We have managed to hold the price on these fabulous high speed, Japanese manufactured, quality printers for another month. Don't delay, grab yours now and get a free printer stand from us for Christmas (\$30 value for free). Because it's Christmas (almost), and because we're such nice people, we will ALSO give you a free 2m printer cable with any of the above printers.

### ★★★High Speed Dot Matrix★★★

|                                                 |        |
|-------------------------------------------------|--------|
| AR-55 132col 240cps 9pin 15" tractor feed ..... | \$ 850 |
| AR50 80 col 240cps 9pin 10" tractor feed .....  | \$ 750 |

\*Font Cards available \*Uses FX/MX ribbons \*Pull Tractor Feed to reduce paper jams \*Rugged construction.

### ★★★NEW RELEASE★★★

|                                             |        |
|---------------------------------------------|--------|
| AR-30 80 col 130cps 9pin 10" pin feed ..... | \$ 465 |
|---------------------------------------------|--------|

(AR-30 stock scheduled to arrive 3rd week November)

All Nakajima Printers feature \*Japanese Quality \*Near Letter Quality Print Mode  
\*Twelve months warranty.

## SANTA'S PC PACKS:

**XT Starter Pack** ..... \$1,299

Turbo XT 10MHz 8088-1 • 512K RAM • 1 x 360Kb 5.25" Floppy Disk Drive • Printer port, Serial port, Games port • 84 key AT style keyboard • MS-DOS 3.2 • CGA Colour Video Card • 12"

Monochrome Monitor •

XT Upgrades: 640K RAM \$70 — 101 key keyboard \$50 — Second 360Kb Floppy Disk Drive \$120 — 20Mb Hard Disk and Controller \$580 — Hercules compatible Monochrome Video Card \$20 — 14" CGA .39mm Dot Pitch Colour Monitor \$365 — 14" EGA .31mm Dot Pitch Monitor & Card \$770.

**AT Starter Pack** ..... \$1,899

Turbo AT 10MHz Zero Wait State 80286-10 • 512K RAM • 1 x 1.2Mb 5.5" Floppy Disk Drive • Printer port, Serial port • 16 bit Hard Disk/Floppy Disk Controller • 84 key AT style keyboard • MS-DOS 3.2 • Hercules Compatible Monochrome OR CGA Colour Video Card • 12" Monochrome Monitor •

AT Upgrades: 640K RAM \$145 — 1Mb \$253 — 101 key keyboard \$50 — 20Mb Hard Disk \$440 — 14" CGA .39mm Dot Pitch Colour Monitor \$365 — 14" EGA .31mm Dot Pitch Monitor & Card \$770 — 40Mb 61mS Hard Disk Drive \$680.

All systems include MS-DOS 3.2 and a twelve months full parts and labour warranty supported nationally by Honeywell Bull. Our Christmas present to you with these PCs is a free upgrade of the warranty to an on-site basis for no extra charge. Ask us about this great deal, it's giving you without doubt the best PC value in Sydney.

## FINAL TOTALLY AMAZING SPECIAL!!!

We are offering some very special deals on our current Sharp stock. There is simply not enough room in this ad to say all the good things about the Sharp range so please give us a call to talk about the best money saving deal you could imagine on a Sharp Portable computer. **These special prices can only apply to our current stock so you will have to act now.**

**DON'T MISS OUT ON A VERY SHARP DEAL.**

## STRANGE THINGS:

We have a limited amount of odds and ends, old lines, superseded stock, stuff that won't sell, things like that. It all works, most is brand new. There is some software, all of which is un-opened and has been sourced from the Australian distributors. This is a chance for you to pick up a bargain and for us to clear our store. There's lots of good things like three legged chairs and left handed screw-drivers, **CALL FOR A LISTING!!!** (be quick for these).

**We Accept:** ... Bankcard, Mastercard & Visa. **Warranty:** All products are covered by the manufacturer's warranty. **Sales Tax:** Prices include sales tax. **Sources:** All products have been sourced from the Australian distributors or one of their authorised dealers. **Prices:** Prices are subject to change without notice and stock availability. Please check before ordering. **Delivery:** We use "Overnight" couriers, this usually gives next day delivery for orders from our stock placed before noon.



**Hales & Rogers Pty Ltd.**

5 Mobbs Lane, Carlingford NSW 2118.  
Telephone: (02) 858 5322 Facsimile: (02) 804 6865  
Established 10 years

# Accounting packages

***In the second of our three-part series, 'big eight' accounting and management consulting firm Touche Ross reviews multi-user packages which run on microcomputer-based networks.***

The first article, which appeared in last month's edition of *APC*, was primarily an evaluation of single-user MS-DOS-based accounting packages suitable for smaller businesses running their entire operations on a single computer. We also included a couple of reviews of smaller multi-user packages.

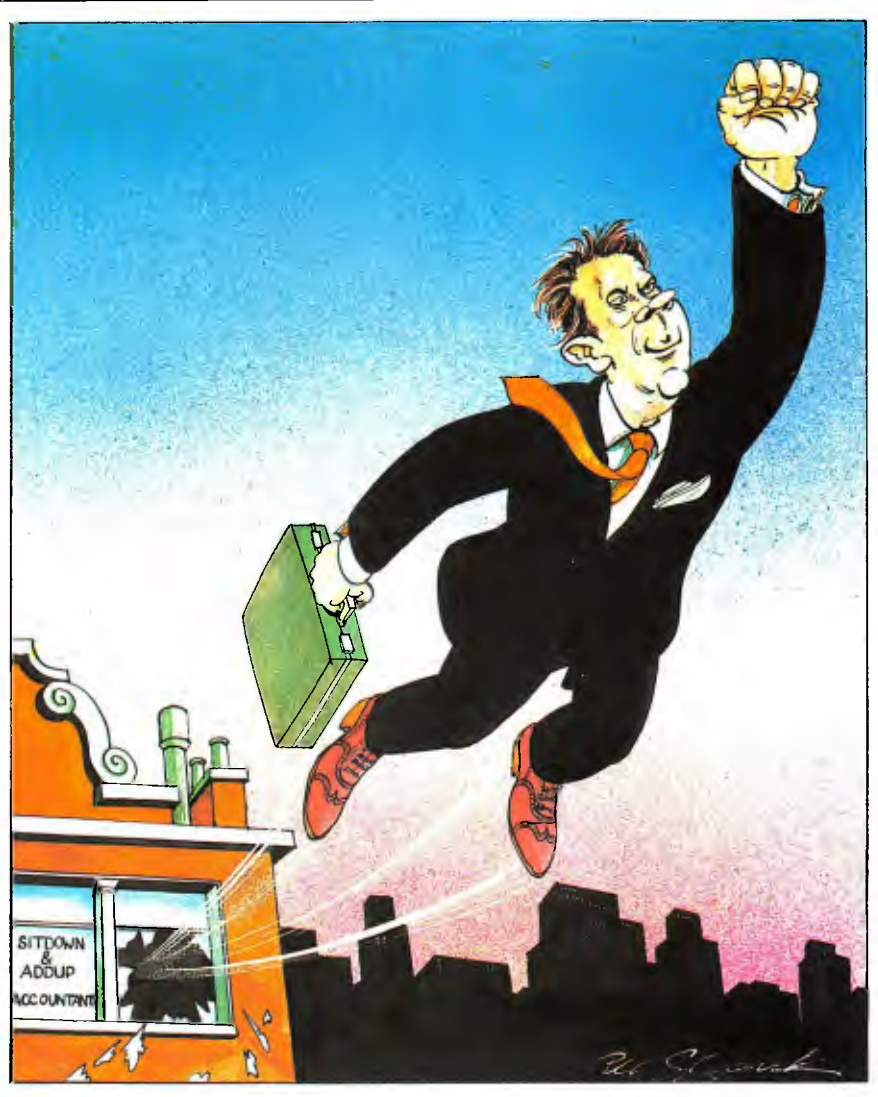
Over the next two issues we concentrate on multi-user packages based on microcomputer-based networks and other multi-user systems, including an added bonus in this issue — a review of three popular accounting packages based on the Apple Macintosh.

All of the accounting packages reviewed in this issue will run in multi-user mode on local area networks (LANs) based either on the NetBIOS standard or the Xenix/Unix operating system. A number of them have been adapted to run on LANs under both families of operating systems.

In historical terms, multi-user microcomputer based accounting packages have come to the microcomputer world from either the single-user PC or the mini/mainframe computing world.

The packages that have come 'up' from the single-user platform have been most commonly, and most successfully, ported to local area networks that run MS-DOS type programs — the NetBIOS. The industry standard LANs in this area are made by the 3Com and Novell corporations, and between them have the lion's share of the world LAN market.

Those packages that have come 'down' from the mid-range and mainframe world have traditionally been converted to run on operating systems



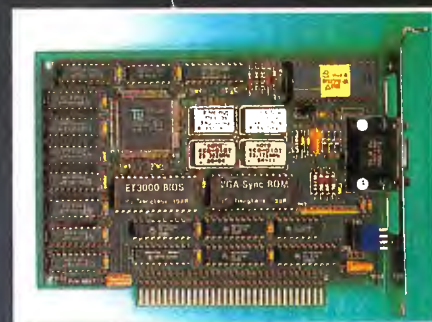




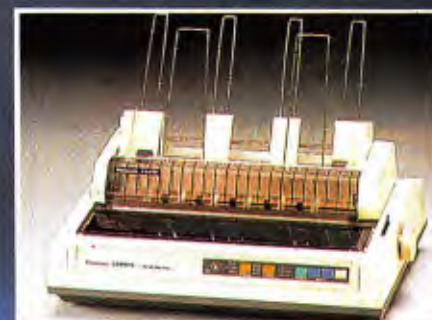
# DELTA COM

AUSTRALIA

Authorised Distributors for:



**Tseng Labs** VGA cards

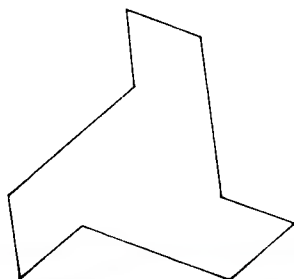


**Panasonic**  
Office Automation



**The power of 80386 computers built here in Australia.**

The New Deltacom XT, AT & 386 machines offer performance, price and possibly the most marketable PCs to be released in Australia.



Call now for your nearest Deltacom dealer.

**ALFA COMPUTERS PTY LTD**

10 REGENT STREET,  
SYDNEY 2000

Phone: (02) 281 2755 Fax: (02) 281 2765

**DEALER ENQUIRIES WELCOME**

similar to their larger parents — such as the Xenix/Unix and Pick operating systems. Many of these packages have also been converted to run on NetBIOS LANs, and it is common to see PC-based accounting packages (CBA for example) that run single-user under MS-DOS, and multi-user on 3Com, Novell and Xenix based systems.

Microcomputers appear to be increasing in power and functionality to such an extent that when joined in various LAN configurations, they offer computing power that five years ago could only have been provided by mid-range and larger systems, and even now can only be provided by these systems at much higher cost and often less flexibility than microcomputer based systems.

At present, there is a much larger range of accounting software available for NetBIOS-compatible LAN's than for the Xenix/Unix based systems. This is historically based. Many MS-DOS based single-user accounting packages can also run on NetBIOS LANs in single-user mode. Another reason for the popularity of NetBIOS LAN compatible accounting packages is that many of them offer file transfer capabilities to other MS-DOS based software, such as spreadsheets, word processors and database applications. Xenix LANs also offer this capability, but at present the connection is often not as seamless as with MS-DOS to MS-DOS packages.

currently available in both single and multi-user versions. We were fortunate to review the newly-released version 2, which runs in single-user mode at present and will be released in multi-user version in mid-November 1988.

## Review of modules

**General Ledger** AccountMate's General Ledger is based on a 12 or 13 period cycle that includes transaction batch posting to previous, current or future periods. Accounts are grouped by default into ranges of account numbers, but may be changed if necessary. Charts-of-accounts may be copied for setting up additional

companies. Other features include: budgets for previous and current year; prevention of out-of-balance posting; detailed reports for entire company or individual departments; subtotalling at three different levels for account activity reports and income statements; budget/actual account balance comparison; and automatic percentage distribution of transactions.

**Accounts Receivable** The Debtors Module provides both an invoicing and receivables system and may be run standalone or with the Sales Order Module. It also provides inventory features which are integrated with the Sales Order and Purchase Order Modules. Open-item or Balance Forward billing

## AccountMate

AccountMate is a high-quality package written in dBASE III Plus, distributed in source code, Clipper or FoxBase compiled format. It may be used in a single or multi-user environment. Either dBASE or a work-alike is required to run the source code version.

Documentation is good and provides numerous examples. The system is menu-driven and provides online help. A book of sample reports is provided, however, an index for the user manual is lacking. The level of presentation is geared to the non-accountant, typical of the smaller business market for which this package is marketed. Additional documentation screens also appear in complex processing sections, with strong and user-friendly screen editing procedures.

Fields are scanned and validated after completion of data entry. A choice of confirming, editing, voiding, retyping, quitting, forwarding to the next record or backing to the previous record, is given on completion of screen entries. The largest installed base of AccountMate users runs under version 1.2, which is

## An accounting package for only. ... \$299 (inc.tax)

**An extremely easy to use, yet powerful accounts receivable and customer tracking package.**

**"It's local, it's cheap and it's good!" Ewart Stronch  
Your computer. June 1988.**

### INVOICES:

- On screen entry and editing.
- Instant print on any stationery.
- Easily formulated to suit any type of stationery.
- Recall invoices.

### MAILING LISTS:

- Prints all or specified accounts.
- Labels printed on any format.

The screenshot displays a software window with a menu bar (Account, Contact, Company, Address) and a main data area. The data area shows fields for Name, Address, Phone No., and Contact. Below this, there's a section for 'Type' with a dropdown menu. To the right, there's a summary of sales and financial data, including 'Sales', 'Financial data entered', and 'Lost' amounts. At the bottom, there's a 'Notes' section with a text entry field.

### CUSTOMER TRACKING:

- Full name, address and phone number.
- Next and last contact date.
- Note pad style storage of information on customers, that can be easily read and updated.
- ... and many more

### STATEMENTS:

- Full statement printing.
- Aged accounts with date breakdown in 7, 14, 21, 30, 60, 90 + days.
- Search on outstanding balance.

Dealer and other enquiries welcome!

**Customisation and modifications available.**

**IDEAL**  
SYSTEMS

**CHIEF**

THE CUSTOMER TRACKING & ACCOUNTS RECEIVABLE PACKAGE BY IDEAL SYSTEMS



**IDEAL SYSTEMS Pty. Ltd.**

200 Lygon Street, Carlton, 3053.  
P.O. Box 172, Carlton South, 3053.  
Phone: (03) 663 6276.



# **A POWERFUL, FULLY INTEGRATED ACCOUNTING SYSTEM FOR \$450 OR YOUR MONEY BACK**

# **DESKTOP ACCOUNTANT**

As the publishers of the largest range of business software in Australia, Reckon has had the opportunity to evaluate more than enough accounting software world wide.

They were so impressed with this package, they have not only chosen DeskTop Accountant for publication but use it themselves.

## **What does DeskTop Accountant offer?**

Those features you would naturally expect from a quality accounting package, including:

### **Fully integrated**

- Sales Ledger
- Purchase Ledger
- General Ledger
- Invoicing and Statements

### **Special features include:**

- Multiple cost centre accounting with individual and consolidated reporting.
- Split period accounting.
- Open item or carried forward accounts for both customers and suppliers.
- Singular or batch invoicing with smart stationery readily available.



Contrary to expectation, research showed that 60% of small businesses have little or no use for a Stock Control Module . . .

## **So why pay for it?**

If you are one of the 40% that do require stock control and want the same sort of power as DeskTop Accountant on the other modules, Reckon Software recommend Attaché 4® at \$999.00. If you require quality and power, but have no need for a stock control system then DeskTop Accountant is your answer at \$450.00.

*"Give a person a choice and they can't make a decision . . ."*

The people at Reckon realise that this is probably the umpteenth time you have read information regarding the accounting package you should buy, so to make your decision absolute and to avoid any further grey hairs, they are making this offer: *If you are not happy with DeskTop Accountant, you have 21 days in which to return the package and they will give you your money back.*

For further details on where to obtain your copy, please contact:

**Reckon Software Publishers Pty Ltd**  
706 New South Head Road, Rose Bay, NSW 2029  
Phone: (02) 371 9222 Fax: (02) 371 0098

**RECKON**®  
PTY LTD  
SOFTWARE PUBLISHERS & DISTRIBUTORS

Attaché 4 is a registered trade mark of Attaché Software Pty. Ltd.

## FEATURE

methods may be used. Credit is checked during processing and a warning message is given if certain limits are exceeded. Prepaid invoice documents can be created as unapplied credits for application at a later stage. Automatic, semi-automatic and manual payment methods are allowed.

Other features include: sales commission calculation and report; designation of commissionable and noncommissionable items; separate General Ledger account for each inventory item; ability to modify invoices if still unpaid after posting; and automatic posting for recurring invoices.

**Accounts Payable** This can run as a standalone module or in conjunction with the General Ledger and Purchase Order Modules. Up to 30 general ledger distribution accounts may be specified during setup. Hand-written cheques are recorded, providing the convenience of entering an invoice being paid in one step. Payment urgency ranking prioritises payment application and cheque printing and regular invoices may be generated automatically. AccountMate's Accounts Payable prints or displays a range of reports on ageing, cheque reconciliation, cash required, voided cheques, vendors, general ledger account distribution, discounts and deleted invoices.

**Sales Order** AccountMate's Sales Order may be run as a standalone module or integrated with Accounts Receivable, Purchase Order and Sales Order Modules. Its automated order entry system generates sales orders which are not closed until every item has been acknowledged as shipped. Warnings are given when items ordered reach their reorder point or exceed the amount on hand.

User-defined customer payment terms, credit limits, customer and item discounts may be overridden during posting.

Available reports include: sales order, order status in detail and summary, shipment activity report, backorder reports, monthly inventory activity analysis, inventory adjustment entries report and an inventory price list.

**Purchase Order** This module can run as a standalone module or integrated with Accounts Payable. Vendors and inventory items may be entered 'on-the-fly'. Orders remain open until every item is acknowledged as received.

Other features include backorder maintenance and entry of new inventory items during posting. Key reports consist of a status report of all month's orders and any open orders from prior months in a variety of sort sequences. A backorder report, month-to-date goods

### At a glance

#### AccountMate

**Supplier:** Calmar Business Systems  
**Tel:** (02) 698 1999

**Price:** General Ledger, \$930; Accounts Receivable, \$570; Accounts Payable, \$690; Sales Order, \$690; Purchase Order, \$690.

**Requires:** IBM PC/XT/AT compatibles, PC-DOS or MS-DOS 2.1 or later, 640k RAM; LAN support: IBM Token-Ring, Novell, 3Com 3 Plus, dBASE III Plus (not required for compiled versions).

**In short:** Suited to the less sophisticated business environment. Comprehensive documentation with numerous examples.

received and master file listings are also available.

### Conclusion

AccountMate is a well presented, well documented, multi-user accounting package. It is a flexible, mature product and is probably best suited to the less sophisticated business environment.

### CBA

Commercial Business Applications (CBA) offers good functionality with 13 modules at both single-user and multi-user levels. It is designed to support multi-divisional rather than multi-company accounting entities, but can be set up for multi-company processing. The system has a powerful report writer facility as well as a General Ledger and Sales Analysis report writer. All modules and processing are menu driven, and the manuals provide detailed recommended procedures for routine, daily and monthly procedures and give brief descriptions for each menu option. There is an online help screen for every menu option which can be accessed easily. All processing is driven by batches which are assigned unique numbers by the user. This offers relatively good control with batch control totals needing to balance in order to post the batch.

### Review of modules

**General Ledger** The General Ledger alone cannot process to multiple bank accounts for cash in and cash-out, so businesses who plan to use several bank accounts will need to purchase the Cash Book. Outstanding features in-

# FREE OFFER Accounting Software

Do you have a PC or are you thinking of buying one? So, what are you doing about your accounts?

The share market crash has made businesses even more brutally aware of how vital good accounting and information systems are.

Attaché, the biggest name in PC accounting software, has prepared a demonstration disk that runs just like the real thing. This is your opportunity to examine Attaché in the convenience of your office or home.

We will even include additional information specific to your type of business, size of company and areas of interest. Just tell us what they are.

Simply mail this FREE OFFER coupon today or phone (02) 929 8700. Distributors Australia wide.

## Attaché

*Bullet proof reliability.*

Mail to: Attaché Software Australia Pty. Ltd.  
10th floor, 8 West Street, North Sydney, NSW 2060.

Yes! Please send my FREE Demo Disk and other information about Attaché.

Name .....

Company .....

Address .....

..... P'code .....

Business Phone .....

Type of Business .....

Number of Employees .....

Dealer spoken to (if any) .....

Have PC? Yes/No

Disk size: ☐ IBM 5¼ ☐ IBM 3½ ☐ Apple Mac

Areas of interest (Please tick)

☐ Accounts Receivable ☐ Accounts Payable

☐ Invoicing ☐ General Ledger

☐ Inventory ☐ Payroll

☐ Other .....

Genuine Business enquiries only please.

APC



clude: user-defined account structure and facility for subcodes; multi-branch and multi-department accounting; selective reporting consolidation; on screen enquiries; user-defined financial reports with the General Ledger Report Writer allowing six different column formats; automatic integration to other modules; facility to copy the chart-of-accounts from one Branch and/or division to another; standing and accrual reversing journals; and the facility for spreadsheet integration.

**Accounts Payable** This module is able to hold/delay invoices in dispute or part thereof. Automatic payment selection is determined by the hold function which makes selection simple. The ability to make either manual payments or to use the automatic selection function and produce remittance advices is useful. Outstanding features include: screen enquiries for creditor's history; facility for temporary creditors who are deleted when fully paid; creditors' balances can be kept in open item or balance brought forward format; invoice hold option; manual cheques; automatic and selective cheque printing; integration with the General Ledger if installed; and aged creditor analysis.

**Accounts Receivable** This module allows for a high level of Sales Analysis and reporting by salesperson, customer type and interest type. Accounts Receivable has a good sales analysis report writer. It is further enhanced by integration with the Point of Sale Module and/or the Special Pricing Module.

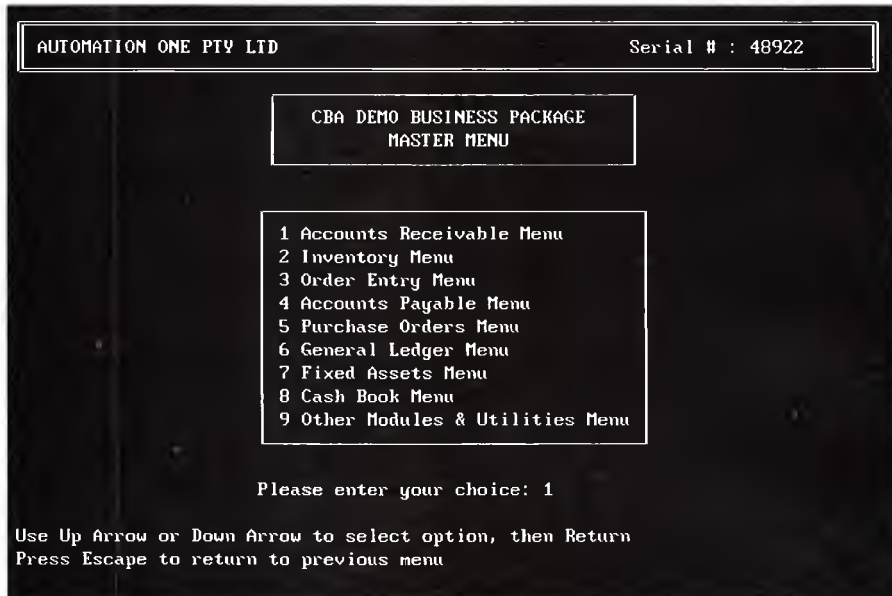
Standard reports are limited. To obtain a wider range of custom reports such as daily reports for invoices received and cash receipts, there is the Dataflex Query report writer.

**Cash Book** Designed for businesses requiring processing of more than one bank account. It provides useful cash flow analysis and forecasting for the year in user-defined expense and income groups and assists with the bank reconciliation.

**Inventory** A thorough module enabling on-screen enquiries of stock activities, sales and purchase histories, stock valuations, back orders and current transactions. Inventory is fully integrated with the Accounts Receivable Module and has the ability to report by either stock code or stock category.

**Purchase Orders** Integrates with Accounts Payable, Cost Management, Inventory and General Ledger. It is able to enquire on orders by supplier, stock code, job number, general ledger account or purchase order.

**Order Entry** Integrates to Inventory and Accounts Receivable and has a backor-



*CBA's main menu. There is also an online help screen for every menu option*

der facility. Sales Order Entry allows screen enquiries by customer and stock code and generates invoices, order numbers and packing slips. It can be greatly enhanced by integration to the Special Pricing Module.

**Bill of Materials** This module is integrated to the Inventory and Order Entry Modules. Bill of Materials allows for labour and materials to be included in the cost of production. The time taken to manufacture and assemble finished goods is taken up through integration with the Payroll module. Bill of Materials allows 22 levels of sub-assemblies, automatic updating of finished goods and has useful reporting facilities for labour, machinery and component usage. It allows entry of factory orders for production of finished goods.

**Cost Management** Integrates with Inventory, Accounts Payable, Accounts Receivable, General Ledger, Payroll and Purchase Orders. This module enables detailed analysis of labour and material expenditure and revenue for jobs. Cost Management operates by allocating and monitoring the various costs for jobs. It allows for comparisons of actual to estimates on a month, year and job-to-date basis.

**Payroll** This is a very powerful module which, when integrated with the Cost Management Module, facilitates extensive cost analysis. CBA Payroll is initially fairly complex for the end user to understand, however, perseverance is rewarded. Payroll allows for automatic calculation of annual leave and sick pay and payment of leave before due. By adding to the codes, a large number of ad-

ditions, deductions, pay types and allowances can be entered.

**Fixed Assets** This module is designed to function as an asset register. Fixed Assets records the purchase and sale of assets and will calculate depreciation using either prime cost or diminishing value methods.

**Point of Sale** This module can greatly enhance the Accounts Receivable module by allowing for register sales. Point of Sale can cater for cash, account, lay-by and gift voucher sales, and allows for credit card and cheque payments. It can handle wholesale and retail sales and provides comprehensive reporting.

**Special Pricing** A further enhancement to the Accounts Receivable and Order Entry modules, the Special Pricing

## At a glance

### Commercial Business Applications (CBA)

**Supplier:** Automation One

**Tel:** (02) 387 7700

**Price:** Per module: single-user, \$998; small multi-user (2-4 terminals), \$1454 per module; large multi-user (5 + terminals), \$1818; Xenix version (1-4 terminals), \$1567; Xenix Version (5 + terminals), \$1932.

**Requires:** 384k for DOS, 1Mbyte for Xenix.

**In short:** CBA is a flexible package suitable for a wide range of businesses and has the capacity to process on a multi-branch and multi-divisional basis.

# WHY DIDN'T SOMEBODY TELL ME...?



Bill has discovered his old Accounting Software just can't keep pace with the changes to his business. His investment is outdated and he needs to start again. At greater cost, and disruption to his business.

If only someone had told him there was a package that could keep up the pace. That could be changed if necessary, without expensive programmers.

The answer to Bill's problem is quite simple. EXOGEN Modifiable or EXOGEN Advanced Modifiable Accounting would have avoided this unnecessary expense and disruption.

You see, when you buy Accounting software by EXOGEN Business Tools you don't just get an Accounting package.

## YOU ALSO GET:-

- Source Code and Host Language. So you can change the software as your needs change. And the Language just happens to be a complete relational database you can use for other applications as well.

- Integrated Accounting, ready to run, straight out of the box. And all the forms you need for invoices, statements, orders and payslips are available off-the-shelf.
- A dynamic growing product, constantly improved and updated in response to requests and comments from our users. Yes, we do listen!
- A quick and easy upgrade path from single to multi-user. We can even supply the Local Area Network.
- Support our customers call "unequaled".
- A Thirty (30) day money back guarantee. No questions. If it doesn't suit your needs, send it back for a refund (less \$25.00 handling fee).

**EXOGEN Modifiable Accounting** - Debtors, Creditors, General Ledger, Database Language and Source Code in an easy to use integrated package \$1410 s/u Inc Tax

**EXOGEN Advanced Modifiable Accounting** - all the above PLUS Inventory Control, Sales Orders, Purchase Orders, Back Orders and Payroll. \$2000 s/u Inc Tax

Bill of Materials and Job Costing are available as options.

Payroll is also available stand alone.

If you don't want to be stuck with somebody else's idea of accounting do as Bob did.

Visit your local EXOGEN dealer or post the coupon today for more information.

## EXOGEN BUSINESS TOOLS PTY LTD



ADELAIDE: (08) 211 7922  
MELBOURNE: (03) 862 2711  
SYDNEY: (02) 624 1544  
BRISBANE: (07) 891 1155  
CHRISTCHURCH: (03) 380 469  
CANBERRA: (062) 918 550

**DEALER ENQUIRIES WELCOME**



## FREE DEMONSTRATION DISK

PLEASE SEND ME MORE INFORMATION ON:-

- ☐ MODIFIABLE ADVANCED ACCOUNTING  
☐ BILL OF MATERIALS  
☐ JOB COSTING  
☐ PAYROLL STANDALONE

NAME: .....

COMPANY: .....

ADDRESS: .....

PHONE: .....

POST TO:  
HEAD OFFICE  
EXOGEN BUSINESS TOOLS PTY LTD  
229 Gouger Street, ADELAIDE, SA 5000  
Telephone: (08) 211 7922



## FEATURE

Module allows a flexible system of special prices and discounts for customers or customer types for existing products. It also provides for comprehensive reporting.

### Conclusion

CBA has proved to be very popular with businesses in Australia and is constantly on the move with new developments and enhancements.

If your business requires a flexible product to adapt to your own environment without having a system specifically written for your own purposes, CBA would be a reasonable investment.

### Multisoft

Multisoft Premier Solutions is written in C and all its files are Informix compatible, allowing you to access data from other systems.

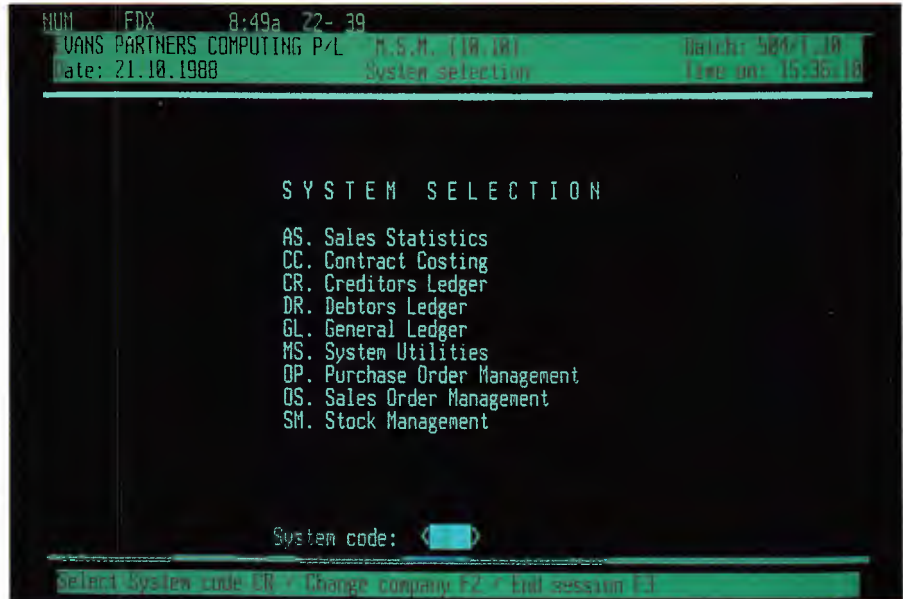
To use any of the application modules in the package you must also purchase the System Manager Module. This module is designed to remove the user from the Xenix/Unix operating system and to provide an integrated environment for accounting, word processing, databases and spreadsheets.

There is a lack of online help information. Useful prompts are provided on the bottom lines of the screen, but for detailed help the user must consult the manual.

### Review of modules

A key feature extending across all modules is the facility for multiple companies and multiple currencies, 99 of each.

**General Ledger** Up to 24 periods (months) may be kept open in the ledger, enabling the user to continue processing into a new financial year



Useful prompts are provided on the bottom lines of the screen

while still finalising the end-of-year accounts. Detailed transactions may be held for up to twelve months and it is possible to structure the system to have multiple subsidiary ledgers feeding into the General Ledger.

The key features of this module include: 12-character alphanumeric account code; unrestricted number of cost centres and nominal account groupings; consolidations for group accounting; full cash book system; automatic journals for regular posting data; prepayments and accruals with automatic reversals; forward postings up to a year ahead; full audit trail; and flexible report writer.

**Creditors** The Creditor Module integrates with the Purchase Order Management, Costing and General Ledger modules. The reporting is very flexible and standard reports include Proposed Payments, Outstanding In-

voices and Supplier Turnover and History.

This module features: open item accounting; optional history files of paid invoices; multi-currency and multiple bank accounts; automatic calculation of payment-due date and settlement discounts; flexible payment facilities; and user-definable reporting facilities.

**Debtors** The Debtors Module may be integrated with Sales Order Management, Contract Costing, General Ledger and Sales Order Statistics. It allows you to select an accounting period of either one week, four weeks or one month. Up to 99 periods of history information may be retained and each debtor can have an unlimited number of delivery addresses.

Exchange rate gains/losses are automatically calculated and can be linked to up to 99 Currency Gain/Loss accounts in the General Ledger.



## CHARTER SERIES — QB 2.0

Management at your fingertips

The Charter Series Accounting software has been designed to reliably answer specific management needs.

New streamlined functions have been designed and included in an already extensive range of software options.

Highly desirable functions like the Charter Series record locking, multi-user capability which is something so necessary to an everyday multi-user system, it's surprising it hasn't become standard on all software packages.

To make Charter even easier to use, the manuals have been given a bold new colour coded design.

WRAP UP ALL YOUR ACCOUNTING PROBLEMS BY CALLING YOUR LOCAL OFFICE NOW

New South Wales  
Ph: (02) 713 2322  
Fax: (02) 712 1442

Victoria & South Australia  
Ph: (03) 240 8044  
Fax: (03) 824 0472

Queensland  
Ph: (07) 870 9655  
Fax: (07) 870 1628

Western Australia  
Ph: (09) 368 1366  
Fax: (09) 367 3663

Papua New Guinea  
Ph: (675) 257 344  
Fax: (675) 257 404



# ABS: ACCOUNTING & ABS: BUSINESS

**INTRODUCING A REVELATION IN BUSINESS SYSTEMS PACKED WITH PERFORMANCE AND ENDURANCE. EASY TO USE TODAY, EASY TO ADAPT FOR TOMORROW, WHAT BETTER CHOICE!**

**THE SUPERIOR MODIFIABLE COMBINATION OF ADVANCED REVELATION TOGETHER WITH ABS: ACCOUNTING OR ABS: BUSINESS, MAKES THE DAY-TO-DAY RUNNING OF YOUR BUSINESS SO MUCH EASIER.**

**FROM BUYING AND SELLING TO FINANCIAL AND ANALYTICAL REPORTING. WHAT OTHER SYSTEMS CAN PROMISE AND DELIVER THESE FEATURES...**

## ■ PROUDLY AUSTRALIAN

Designed and developed for Australian conditions by a team of experienced businessmen, accountants and computer programmers.

## ■ ADVANCED REVELATION

Written with the powerful database management system that soared to No. 4 in the U.S. in just 10 months.

## ■ FULLY MODIFIABLE

Both systems are built on a foundation that permits modifications easily and quite often very simply.

## ■ SOURCE CODE INCLUDED

Gives you future peace of mind and freedom of choice as to who makes any changes – you or us.

## ■ SECURITY PLUS

Numerous methods available to protect your confidential data. A must!

## ■ SINGLE USER OR NETWORK

ABS systems cost no more to run on a network than on a stand alone PC. Proven file and record locking built-in and supports a host of networks.

## ■ FAST, EFFICIENT AND SIMPLE TO USE

Partial name look-up, Popup screen listings, ability to pause one job and start another, extensive on-line help, comprehensive yet easy to read documentation and only 5 essential function keys. Just some of the many superb features in ABS: Accounting & ABS: Business.

## ■ ABS: ACCOUNTING

The three primary accounting functions of Accounts Receivable, Accounts Payable and General Ledger

## ■ ABS: BUSINESS

Purchasing, Selling, Inventory Control, Stock & Sales Analysis, Direct Mail facility, Report Generator Plus ABS: Accounting fully integrated.

**ASK FOR FURTHER INFORMATION ON THE OUTSTANDING ABS SYSTEMS. WE MAKE THE OPERATION OF YOUR BUSINESS AND THE ACHIEVEMENT OF YOUR GOALS SO MUCH EASIER.**



## AUSTRALIAN BUSINESS SYSTEMS

Level 2 Cnr Stoddart Road & Church Lane Prospect • A Unit of Caraga Holdings Pty. Ltd.  
• PO Box 726 Blacktown NSW 2148 • Facsimile (612) 631 2622 • Telephone (02) 631 0922

JAMES 2463



## FEATURE

The key features include open item accounting, multi-currency, multiple bank accounts, automatic cash matching facility and user-definable reporting facilities.

**Stock Management** Stock items may be accessed by ID code, short description, or a third user-defined key. Multiple stock locations may be recorded and there is a wide choice of stock valuation methods including FIFO, average, actual, standard and last cost. In addition, the module accounts for serial and batched stock items, alternate products, alternate suppliers and superseded products.

**Sales Order Management/Invoicing Module** Offers credit checking, standing or periodic orders, flexible discount structures, stock picking lists and full integration with the multi-currency facility of the Debtors Module.

**Sales Statistics Module** Contains on-line enquiry facilities providing analysis by product, salesperson, customer and delivery address. Reporting is flexible and reports may be printed or displayed on the screen.

**Purchase Order Management Module** This includes features such as free format purchase order design, overdue orders checking, and automatic General Ledger accruals for non-invoiced

### At a glance

#### Multisoft Premier Solutions

**Supplier:** Softsys

**Tel:** (02) 387 8055

**Price:** Price varies depending on the number of licensed users. Indicative prices, on a Xenix system are: 1-4 users, \$1995 per module; 5-8 users, \$2610 per module; 9-16 users, \$3980 per module.

Indicative prices, on a Unix System IV: 5-8 users, \$2910 per module; 9-16 users, \$4360 per module; 17-32 users, \$6490 per module; 32+ users, \$9800 per module.

**Requires:** Super micro and minicomputers. Preferably '386-based processor as a minimum, but the system will run on a '286 processor with a small number of users. Operating system: Unix/Xenix. Memory required varies according to the number of users. As a guide, 1Mbyte for the console plus 0.5Mbyte for each workstation. Minimum 40Mbyte hard drive.

**In short:** Premier Solutions is a fully integrated accounting package, developed to run under the Xenix/Unix operating systems on super micro and minicomputers.

| PACIFIC ELECTRONICS        |                      |                      | -- P A C S O F T --    |  | Ver: RET<br>12/10/88 |
|----------------------------|----------------------|----------------------|------------------------|--|----------------------|
| ACCOUNTS RECEIVABLE        |                      |                      |                        |  |                      |
| 1. Enquiry                 | 2. Open/Update       | 3. Invoice           |                        |  |                      |
| 4. Credit                  | 5. Receipt           | 6. Listing           |                        |  |                      |
| 7. Trial Balance           | 8. Statements        | 9. Sales Analysis    |                        |  |                      |
| ACCOUNTS PAYABLE           |                      |                      |                        |  |                      |
| 10. Enquiry                | 11. Open/Update      | 12. Order Entry      |                        |  |                      |
| 13. Invoice Entry          | 14. Credit Entry     | 15. Payment          |                        |  |                      |
| 16. Trial Balance          | 17. Listing          | 18. Expense Analysis |                        |  |                      |
| STOCK CONTROL              |                      |                      |                        |  |                      |
| 19. Enquiry                | 20. New Stock        | 21. Update           |                        |  |                      |
| 22. Stock Adjustments      | 23. Price Lists      | 24. Trial Balance    |                        |  |                      |
| 25. Listing / Shelf Labels | 26. Stocktake Sheets | 27. Sales Analysis   |                        |  |                      |
| BANK / GENERAL             |                      |                      |                        |  |                      |
| 28. Cash Summary           | 29. Bank Adjustments | 30. Bank Statement   |                        |  |                      |
| 31. Accounting             | 32. P.O.S. Control   | 33. P.O.S. Logon     |                        |  |                      |
| 34. End of Month/Year      | 35. Report Generator | 36. Shutdown         |                        |  |                      |
| Please Enter Selection:    |                      |                      | (c) A. Darbyshire 1987 |  |                      |

*Pacsoft's flat menu system, listing all available options on the screen*

deliveries. Prices can be held in foreign currencies and a revaluation of sales cost is carried out if stock is sold prior to invoice posting.

**Payroll Management Module** Handles company superannuation schemes and variable payment methods for employees. It retains employee payment details for 12 months, produces group certificates, and handles sick, holiday, termination and long service leave payments.

**Contract Costing Module** Key features include a multi-level tree structure with cost heads at any level, postings to any period in the current year or up to three future years, and transactions are held for the life of the contract. The module also has online enquiries and the facility for customised reports.

Other modules offered are Bank Reconciliation, Fixed Assets, Word Processing and Premier Batch Update.

### Conclusion

Multisoft Premier Solutions is one of the Rolls Royce accounting packages available for the micro and minicomputer market. It is not cheap, but we believe it provides excellent value for money and is especially suitable for large businesses.

### Pacsoft

Pacsoft is written in DataFlex, a popular 4th Generation database language (4GL) and employs a 'flat' menu system rather than the traditional tree-structure. It lists all available options on the screen, making operations relatively

simple and straightforward for users unfamiliar with the system.

Reference to the manual was virtually unnecessary and the built-in Dataflex query function allowed quick reference to any debtor/creditor. The system also maintained an open file of all client transactions, as well as unpaid invoices and back orders not yet filled. This allowed for easy reference and allocation.

Stock items could be easily added, deleted, or changed; price lists easily updated; and adjustments easily made. There was even provision for creating shelf labels!

The package did not contain a full general ledger system but maintained individual ledger accounts. An audit trail of entries was not maintained. The only audit trail available was to the cash entries made to the bank account. Should adjustments need to be made to the balance sheet, they could be directly imputed without journals; however, the unappropriated profits account was automatically adjusted in order to balance the balance sheet.

Finally, because the system was written in DataFlex, an addition has been made to the manual showing the user how to operate the DataFlex Query language and create customised reports on any fields contained in the database. This has strong implications for the efficient management of a business, as relevant data can be easily generated.

### Review of modules

**Accounts Receivable** The Accounts Receivable module is capable of han-



**If you're self-employed or run your own business, Lewis CROSS-CHEQUE will help keep your accounts in order.**

Join the 800 other businesses who are using CROSS-CHEQUE to keep track of their income and expenditure.

To help in preparing your tax return, CROSS-CHEQUE prints reports detailing each income and expense category.

You simply enter details directly from cheque butts or deposit slips. Any cheque can be split across several expense accounts. Handles 120 categories of income and expenditure. Allows you to do bank reconciliation.

The latest version of this popular package has dozens of new features, including:

- A new report listing the month-by-month values of each income and expenditure category.
- Abbreviations for regular payees.
- Much more comment space for cheques and deposits.
- Summary reports can be written to a disk file.
- General Ledger Code number.
- Unpresented cheques automatically brought forward for new financial year.

"If ever there was a small software accounting system that could be described as ideal for the very small business, Lewis CROSS-CHEQUE would fit the bill." Dan Lawrence, Your Computer, August 1986.

**CUSTOM-MADE  
SOFTWARE (SALES)  
PTY LTD**

P.O. Box 507,  
Randwick NSW 2031  
Tel. (02) 399-8566



**Dr Geoffrey Lewis.** In 1965 he was selected by IBM to demonstrate the new System 360. He was selected following a sensational score of 150 out of 120 in a university test for mathematical aptitude. He was awarded the extra points for exceptional problem solving ability and in the next ten years nobody else got more than 75 marks. He has applied his problem solving ability in producing four software packages written for Australian conditions.

### Lewis LETTER MAGIC

Most wordprocessors let you do all forms of word processing: letters, articles, books, price lists, footnotes and computer programs. They become top-heavy with features and hard to operate.

LETTER MAGIC concentrates on only one application, the very important one of writing letters. Your letter automatically starts with the date, name and address of the person you are writing to. Standard letters, paragraphs or phrases are easy to do. Sign-off your letter with one key-stroke.

LETTER MAGIC has a database for names, addresses and other information. You can send the same letter to many names. You can produce address labels, telephone lists, fees due notices.

"If your primary need for a wordprocessor is letter writing, then Letter Magic is worth your attention, regardless of the word processor you are currently using." Ewart Stronach, Your Computer, December 1987.

### DEMO PACKS

Demo packs, which contain the manual and complete program are available at only a fraction of the price. Not just a fancy scrolling display with impressive graphics but the real program. Actually test it out on your own computer! If you like the program you pay the balance of the price. The programs are available for MS/DOS. Available for Macintosh except LETTER MAGIC.

**50,000 employees are now being paid using the Lewis PAY-PACK payroll package.**

PAY-PACK does all aspects of your pay processing: pay slips, tax calculations, holiday and sick accruals, management reports, group certificates. PAY-PACK is used by over 550 firms, ranging in size from companies with three employees through to BHP.

Over fifty new features have been added to PAY-PACK in Version 4, including:

- Employer Superannuation Contributions;
- Holiday records in days or hours;
- Rostered Day Off accruals;
- Tax averaging for sales commissions.

There are also extra options for:

- Direct entry of bank deposits (\$300);
- Labour Job Costing (\$990).

### HOT-LINE SERVICE

We offer telephone assistance daytime, evening and weekends. We know that a payroll question on pay day must be answered urgently.

### Lewis CASH FLOW

For personal use or for business use.

You enter details of your future transactions for receipts and payments. Specify whether the transaction is one-off or recurs every so many weeks or months. Starting with your account balances, CASH FLOW gives your cash position at any point in the future. This helps you make financial decisions, e.g. when to shift funds between cheque and savings accounts.

Name: .....

Address: .....

Phone: ..... Computer: .....

|                  |                                   |                                       |                                    |                                       |
|------------------|-----------------------------------|---------------------------------------|------------------------------------|---------------------------------------|
| Send more info.  | Pay-Pack <input type="checkbox"/> | Cross-Cheque <input type="checkbox"/> | Cash Flow <input type="checkbox"/> | Letter Magic <input type="checkbox"/> |
| Send demo. pack  | \$60 <input type="checkbox"/>     | \$36 <input type="checkbox"/>         | \$36 <input type="checkbox"/>      | \$36 <input type="checkbox"/>         |
| Send full system | \$990 <input type="checkbox"/>    | \$390 <input type="checkbox"/>        | \$150 <input type="checkbox"/>     | \$490 <input type="checkbox"/>        |

All prices include sales tax. If paying by Bankcard or Mastercard, include card name, number, expiry date and signature.



ding up to 64,000 accounts with on-screen enquiry of debtor details, accounts and transactions. In addition, the module uses an open item basis of transaction maintenance and automatically updates income, expense, cash summary and stock records as invoices and credit notes are entered. Statements can also be printed and customised comment lines added. A client tracking facility keeps a record of contact dates and includes a notepad facility.

**Accounts Payable** The module automatically computes stock economic order quantity and prints reorder reports as required. In addition, it caters for

three user-definable quantity breaks used during invoicing, and four different levels for reference against accounts receivable details when invoicing. The module can also print stocktake sheets (by bin location), price lists and sales reports (by type or code), and allows the user to view a graphical representation (in bar format) of the previous 12 months' sales figures.

**Stock Control** User-definable quantity breaks and levels of reference are the same as for Accounts Payable. This module also provides automatic calculation of economic order quantity and printing of reorder reports, and a graphical representation of the previous 12 months' sales. It prints stocktake sheets (by bin location), price lists and sales reports (by type and code).

**Bank/General** This module provides a useful screen with details of bank, stock, accounts receivable ageing and accounts payable ageing, and automatically calculates working capital. In addition, the module maintains point of sale control by cash register or cashiers. When preparing bank reconciliations, full bank details (including date, type of transaction, reference number and amount) may be printed. A sales tax rebate report can also be printed along with profit and loss

statements and balance sheets in a proper reporting format. An option also exists whereby accounts and transactions may be aged for the commencement of a new month/year's trading.

## Conclusion

Pacsoft is a simple general accounting and stock control program ideal for retailers wishing to computerise their accounting functions. The system is easy to understand and little computer experience is required to operate it. However, professional advice on hardware choice and installation is advisable to ensure a successful implementation.

## RealWorld Accounting System

RealWorld Accounting System offers a fully integrated set of modules that can also be used independently. The system can operate as a single-user system under PC-DOS, or as a multi-user system running under Xenix 286/386 (1-8 users), or on the popular PC networks (Novell, 3Com and Token-Ring for 1-6 users).

## At a glance

**Pacsoft, version 2.01**

**Supplier:** Pacific Electronics

**Tel:** (03) 696 2522

**Price:** single-user, \$2700; multi-user, \$4780.

**Requires:** MS-DOS, C-DOS, C/CPM, Xenix, Unix.

**In short:** Pacsoft is a user-friendly, comprehensive accounting package designed for the small to medium-sized retailer.

## MONEY.. MONEY.. MONEY.. PAY DAYS ARE GREAT!

For the ones getting paid that is. Who gives a thought to the people having to keep track of hours worked, overtime to be paid ... not to mention penalty rates, rostered days off, sick leave, holidays, ... And what about working out the notes and coins every week, Group Certificates at the end of each year ....

### YOUR PROBLEMS COULD BE OVER

If only you had your computer on the payroll! Over 200,000 employees enjoy prompt and accurate payments, thank's to **BM PAY**.

**BM PAY** takes care of casual and permanent staff. — **BM PAY** calculates automatically tax deductions including Medicare levies. — **BM PAY** keeps track of any allowances and deductions, including sick leave, holiday pay, superannuation etc. — **BM PAY** prints cheques, pay envelopes, group certificates, coin analysis (for cash) and detailed management reports. — **BM PAY** direct entry (bank transfers to employees) as standard.

For a mere \$495 your payroll problems could be over.

**Information Unlimited**

2 Prospect Hill Road, Camberwell, Victoria 3124  
Telephone: (03)813 3022 Fax: (03)882 5887

PROBE 3702



## ATTENTION PC PROFESSIONALS

How our accounting package with source code can help you!

Now, an opportunity to save you thousands of dollars and months of your time.

Our sophisticated and proven PC accounts package, developed specifically for the Australian market is available to PC professionals with the entire source code. This means:

- ☆ You can easily and inexpensively modify the package to suit your requirements or the needs of your company
- ☆ You can tailor the package to suit a particular sector of a market or industry. video outlets/garages for instance. As our package includes no royalties or copy protection you are free to sell your modification into this vertical market. Think of the extra income. Think about starting up your own business?
- ☆ You are also free to sell the accounting package as is!

### The Accounting Package

Our accounting package is carefully crafted in Turbo Pascal, and designed for both small or large concerns (up to 100 separate company books can be maintained at the same time). The package comes complete with Debtors, Creditors General Ledger, Cash Book, Invoicing and Stock and is supported with a well documented manual



FOR FURTHER INFO  
PLEASE TELEPHONE  
(02) 680 4808

**CHARACTER SOFTWARE**

# How to account for everybody.

Major  
Australian  
bank installs  
SBT software  
Australia wide.

## The SBT Database Accounting Library

|               |                               |
|---------------|-------------------------------|
| dLedger       | General Ledger                |
| dInvoice/     |                               |
| dStatements   | Billing/Stock/Accounts Rec.   |
| dPayables     | Accounts Payable              |
| dOrders       | Sales Order Processing        |
| dPurchase     | Purchase Order Processing     |
| dPayroll      | Payroll/Labor Accounting      |
| dAssets       | Fixed Assets Management       |
| dProject      | Job Cost Accounting           |
| dMaterials    | Manufacturing Planning        |
| dProfessional | Time & Billing                |
| dProperty     | Property Management           |
| dMaintenance  | Service/Equipment Maintenance |

And we do mean everybody.

You see, the SBT Database Accounting Library is already accounting for more than 50,000 businesses of every conceivable description.

From law firms and construction companies. To retail stores and manufacturers. From small businesses with one PC. To major corporations with hundreds.

Available in single and multi-user versions for MS-DOS, XENIX, Macintosh, and Atari ST, the SBT Database Accounting Library is a modular system of accounting programs.

You simply pick the ones that match your needs and start accounting.

And when your needs change, you can use our free source code to make software

accountable to your way of doing business.

By the way, our Database Accounting Library runs with the compilers and database management systems everybody uses. Including dBASE III PLUS, McMAX, Clipper, FoxBASE+, Quicksilver, dBase, and DBMAN. This means it will work with your favorite computer and database manager.

The SBT Database Accounting Library.

Everybody who accounts for anyone should look into it.

Call us today for our demo disk and information package, and get yourself accounted for.

Multi user versions available.

## SBT Australia Pty Ltd (02) 212-6933

150 Broadway, Broadway, NSW 2007. FAX: 211-4065

PLEASE SEND ME **FREE DEMO DISK AND ADDITIONAL INFORMATION**

Mail to: SBT Australia Pty Ltd  
PO Box 162  
150 Broadway  
Broadway NSW 2007

Name .....  
Company .....  
Address .....  
Pcode ..... Phone .....



## FEATURE

The menu structure leads you easily through the various options, but once the menus are mastered you often wish for a faster way to move between screens.

The account structure in RealWorld is based on a four digit main account number with a separate three digit profit centre code. The transaction and audit trail information are easily entered and the account number is verified as you enter it. The program calculates a transaction count and batch total as journal transactions are entered.

### Review of modules

**General Ledger** The reports available include a chart-of-accounts list, a transactions list, a trial balance and a general ledger worksheet which can be used to make adjustments to the trial balance. All financial statements must be created using the report writer, a powerful yet easy-to-use program. The module allows detailed online account enquiry. Multiple companies can be consolidated and complete audit trails are provided.

**Accounts Receivable** Detailed line customer enquiry is provided and receivables can be entered as invoices, credit/debit memos, adjustments or

RealWorld - General Ledger  
Version 4.0B, Demonstration

TOUCHE ROSS SERVICES PTY LTD

Please select --

1. Maintain chart of accounts
2. Process general journal transactions
3. Process standard journal transactions
4. Print trial balance
5. Print general ledger worksheet
6. View general ledger accounts
7. Print source cross reference
8. Maintain financial statement layouts
9. Print financial statements
10. General ledger interface

Make a selection, or press F2 for more selections, or F10 for HELP at any time

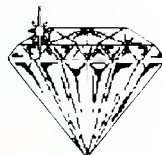
*RealWorld's menu structure leads you easily through the various options*

finance charges. Once entered, you distribute the amounts to various general ledger accounts. The payments screen helps you find the invoices outstanding and you can apply all or part of a cheque to an invoice. This package accom-

modates cash receipts to any of three bank accounts.

**Accounts Payable** This module allows flexible payment selection, including partial payments. The Cash Requirements Report is used to determine which items

## JEWEL



# ACCOUNTING SOFTWARE FOR THE APPLE MACINTOSH

### GROWTH

JEWEL is a powerful and flexible solution allowing additional features and options to be opened/added when required. JEWEL operates in a single or multi-user environment.

### MANAGEMENT TOOL

JEWEL provides a variety of management reports that let you manage with confidence as well as providing the day-to-day processing needs.

### FRIENDLY

Designed to be easy to use, JEWEL can be set up to meet your specific needs, rather than moulding your needs to a system.

### INTEGRATION

JEWEL modules are integrated minimising data entry and possibility of error.

### SUPPORT

JEWEL comes with an easy to follow manual. Developed in Australia, assistance is just a telephone call away. On-site assistance and specific modifications are available as well as training.

### INFORMATION

For full details of the JEWEL package, contact (03) 241 0444



## SCHEDULE 7 EXPERT SYSTEM

### ACCOUNTS PRESENTATION SYSTEM

- The CCH Solware Accounts Presentation System prepares the statutory accounts (Balance sheet, profit and loss statement, notes to the accounts, Directors' report and statement and Auditor's report) for a company or group of companies as required by Schedule 7 of the Companies Regulations from an existing trial balance.
- A comprehensive knowledge base, or "expert system" is provided with "on-line" explanations of Companies Regulations, Schedule 7 and Australian Accounting Standards.
- The statement of the sources and applications of funds, Directors' statement, Directors' and Auditor's reports and notice of the Annual General Meeting and Proxy Form can be produced.
- Beyond this, the CCH Solware Accounts Presentation System provides an interface with existing general ledger packages and enables data transfers.
- Future development of the Accounts Presentation System will provide for consolidation, management accounting and client accounting.

Instant expert help on all the complexities of the new accounting compliance rules is now available.

The Accounts Presentation System provides Schedule 7 help at every stage of preparing the Statutory Accounts. This is far superior to other systems which only help in checking the correctness of the accounts when you've finished.

*For further information or an obligation free demonstration:*

# CALL TODAY!

## **(008) 25 1 235 or (02) 888 2555**

### **CCH SOLVWARE**

*A Division of CCH Australia Limited (Inc. in NSW)*

PO Box 230 NORTH RYDE NSW 2113

*The Information Professionals*



# Zen

## ACCOUNTING SUITE

### UNIX or XENIX SYSTEM V For Peace of Mind

Easy to learn, easy to love.

Sophisticated, fast and flexible.

Makes full use of UNIX capabilities for Background Processing and Inter-office communications, unlike an upgraded DOS product.

- General Ledger & Standing Journals
- Creditors and Purchasing
- Debtors, Invoicing & Orders
- Stock Control & Analysis
- Job, Project, Time Sheets & Plant
- Asset Register & Depreciation
- Bill of Materials/Standard Costs
- Payroll and Award Costing
- Management Query Report Generator
- Multi-Company, multi-branch, multi-user
- Facilities tailored to suit Y O U
- Graphical display and History
- On-line Help
- Enquiry & Account Open during Invoicing
- Economical entry level + upgrade path

See Business Analyst and its big brother ZEN, this Section.

Hundreds of systems installed.

### ZEN for UNIX or XENIX

### Business Analyst for DOS or Concurrent DOS

CALL NOW for Details  
**JOHN SORENSEN**  
**SOFTWARE**

PHONE (07) 369 7844

Level 7, 301 Coronation Drive,  
MILTON QLD 4064

#### SYDNEY:

Xtrasoft (Aust) P/L  
Ph: (02) 609 6682

#### MELBOURNE:

Pragma Computers  
Ph: (03) 850 5933

## FEATURE

to select for payment. Apart from partial payment, any item can be put on hold and the user can flag a given vendor as 'normal', 'hold all payments' or 'not to be purchased from'. The vendor is verified during entry, and the default discounts and ledger accounts are used unless they are overridden.

**Order Entry/Billing** This module allows you to enter orders for immediate billing or for later full or partial billing. Orders can be changed at any time before invoices are printed and information from Accounts Receivable and Inventory Control can be used to ease the order entry process. Automatic credit checks

and handle receiving. Receipt of purchases can be recorded even if a purchase order has not been entered. The module allows blanket purchase orders, shipments to multiple locations, incomplete shipments and overshipments.

**Payroll** Maintains employee payroll information, calculates tax, prints payroll cheques, forms and reports. Hourly and salary employees are handled as well as a variety of pay frequencies.

**Job Cost** With this module, labour costs, material costs, subcontract costs, profit and up to five user-defined cost types are tracked for management. Budgets for all detailed costs can be entered. Jobs cannot be activated unless estimates are equal to the job price. Budgets are tracked against actual costs incurred. All or parts of an existing job can be copied to a new job to avoid duplicated data entry.

**Report Writer/Data Bridge** Reports can be designed and created from data in General Ledger, Accounts Receivable, Accounts Payable, Payroll, Order Entry/Billing, Inventory Control, Job Cost, Purchase Order, Cheque Reconciliation and Professional Invoicing modules. Creation of reports is accomplished with menus and step-by-step prompting. A bridge between RealWorld files and popular spreadsheet, database and graphics packages is provided.

**Bank Cheque Reconciliation** This module provides book-to-bank and bank-to-book reconciliation. You can define up to five cheque books and the reconciliation method to be used in your business. When Cheque Reconciliation is used with Accounts Payable, Payroll or Accounts Receivable, handwritten or computer-written cheques and deposits can be automatically transferred and need not be re-entered in the Bank Cheque Reconciliation Module.

**Sales Analysis** This module consolidates and tabulates information from Accounts Receivable, Inventory Control and Order Entry/Billing modules. Reports obtainable include Sales Analysis by Customer, Item, Item Category and Customer Sales Volume.

### Conclusion

Version 4.0 brings impressive improvements to a professional product, with on-line help, multiple company processing, improved passwords and high-quality documentation with numerous detailed examples of screens and reports. The company relies heavily on its dealer and support network to provide support and training.

The package is a sophisticated menu-

### At a glance

#### RealWorld Accounting System, version 4.0A

**Supplier:** RealWorld Australia

**Tel:** (07) 371 0700

**Price:** General Ledger, Accounts Receivable and Accounts Payable \$1085 (single-user per module); or \$1745 (multi-user per module).

**Requires:** 256k RAM, hard disk; DOS 2.1 or later.

**In short:** A powerful, flexible package with a proven track record. Usually sold through a dealer network.

indicate when a customer has exceeded his credit limit. The module allows you to view orders on file for any customer. The effect that orders have on Accounts Receivable and Inventory Control are automatically recorded and transferred.

**Inventory Control** This provides for 'average', 'standard', 'LIFO' and 'FIFO' inventory valuation methods. In addition to item data, warehouses and specific commission structures can be defined. When this module is used with Order Entry/Billing or Professional Invoicing inventory, transactions are automatically created from invoices and need not be entered into Inventory Control.

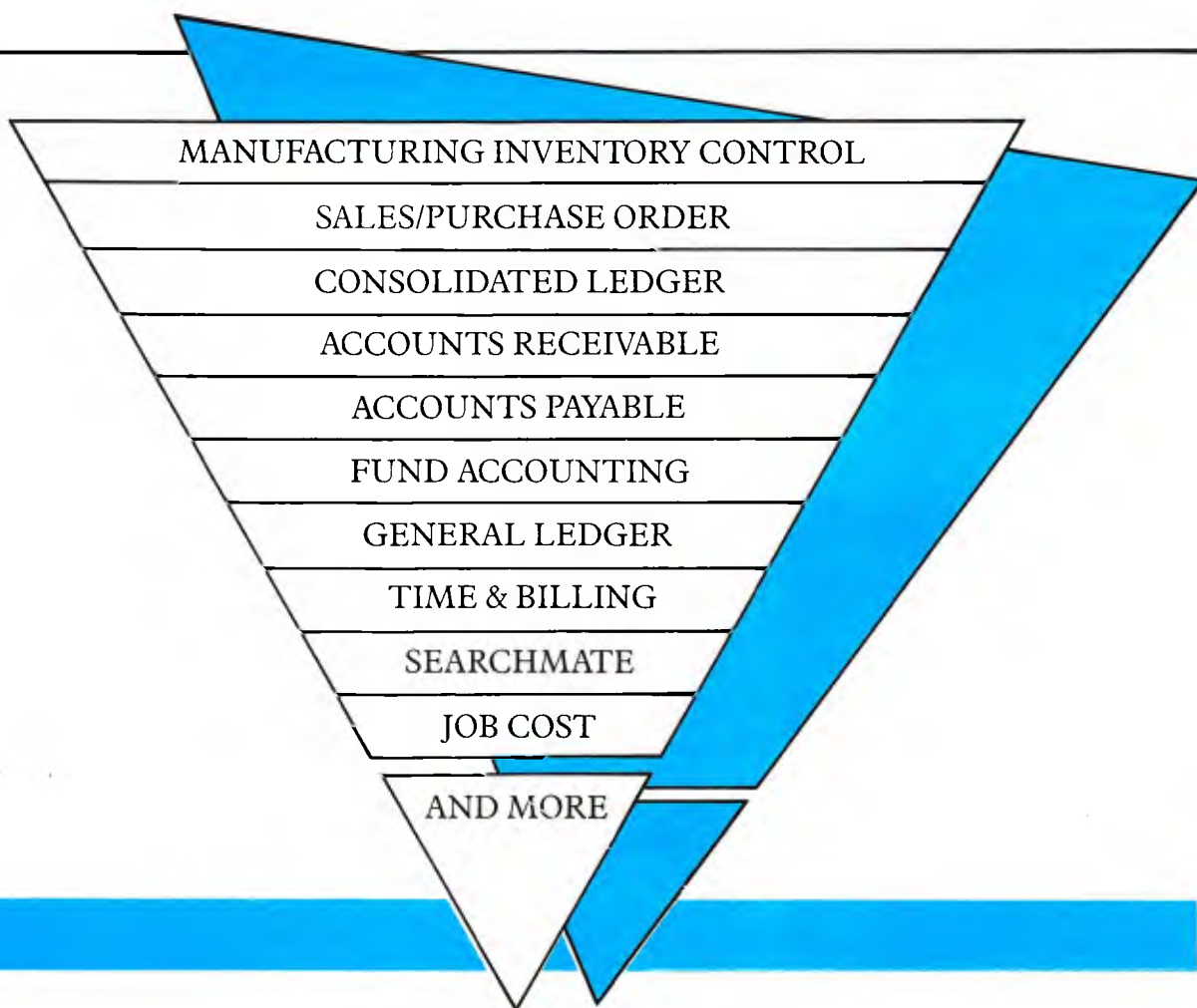
**Professional Invoicing** Invoices can be customised and up to 99 different invoice formats can be created and stored. Unlimited notes can be entered on any invoice and it is possible to create recurring invoices (for service or installment contract billing). Lists of standard services can be pasted into invoices and quotations, and these quotations can be created without affecting receivables and quotations or inventory. These can later be turned into invoices.

**Purchase Order** Purchase Order helps identify what should be purchased, record what has been purchased, print purchase orders, expedite shipments

# Know the limitations. Then exceed them.

*AccountMate<sup>®</sup>*

*Integrated dBase<sup>®</sup> single/multi-user  
business accounting software.*



*Distributed in Australia and New Zealand by*



258 YOUNG STREET, WATERLOO, SYDNEY 2017. TELEPHONE (02) 698 1999

Telegraphic address: "MESERV"; SYDNEY 2007. Facsimile transmission number (02) 699 6735  
A MEMBER OF MEDIA GROUP SERVICES

\*AccountMate is the registered trade mark of SourceMate Information Systems. dBase is the registered trade mark of Ashton Tate.



# FEATURE

driven accounting system with a proven track record. It has an impressive range of modules and features and a large number of third party organisations specialising in development and support of RealWorld compatible products.

## Satchel

Satchel may be used in a single or multi-user environment. When operating as a multi-user package however, the maximum number of users is limited to three. At present, it is not suitable for NetBIOS local area network multi-user operation due to file locking difficulties. The Satchel package consists of three program diskettes, a terminal emulation disk, a user-manual, brief installation instructions and sample stationery, all contained in a characteristic satchel-style briefcase.

## Review of modules

**General Ledger** Nearly 500 accounts are provided as a default chart-of-accounts. However, automatic posting from other ledgers is not available. The lack of integration of Satchel's General Ledger may avoid complexity, but serves to restrict selection of Satchel as a suitable product in areas other than the

```

** SOFTWARE IS COPYRIGHT BY ABACUS DATA SERVICES P/L (AUSTRALIA) - 1983 **

DATE: 25/08/88          TIME: 09:31:39
-----
PORT: 0

*** MENU for SATCHEL Business Software Pack ***

1 - INVOICING/CREDIT NOTE ENTRY
2 - ACCOUNTS RECEIVABLE
3 - STOCK CONTROL
4 - SALES SYSTEM

5 - ACCOUNTS PAYABLE
6 - GENERAL LEDGER
7 - UTILITIES

8 - Exit from SATCHEL system

Your selection : [ _ ]
    
```

Even though online help is not available, Satchel has been designed for the non-technical user

small business environment. The General Ledger reports section includes printing of Trial Balance, General Ledger, Budget Comparison, Chart-of-Accounts, Transactions, Manufacturing statement, Trading statement, Profit and Loss statement, Fixed Assets schedule and Worksheet report.

**Accounts Receivable** The Satchel Debtors Module has four processing sections which include customer maintenance, transaction processing, reporting and month-end processing. Invoices or credit notes entered via this module do not update stock, sales or sales tax (ie, only Accounts Receivable data is updated). If automatic updating is required, invoices and credit notes must be entered via the Invoicing/Credit Note Entry Module.

The Satchel Accounts Receivable Module also includes: balance forward accounting; 10-character alphanumeric customer code; aged trial balance; label printing; statements; transaction reports by transaction type or customer or reference; and bank deposit slips.

**Accounts Payable** The Creditors Module also contains four processing sections. These include creditor maintenance, transaction processing, reporting and month-end processing. Transaction entry via this module does not provide updating of stock, sales or sales tax. General Ledger numbers are specified by the user when entering invoices or credit notes, but the General Ledger chart-of-accounts is not checked since the Satchel package does not allow automatic posting to the General Ledger from other ledgers.

**Invoicing/Credit Note Entry** This module provides the following features: credit note entry; optional updating of stock; retail and wholesale invoice entry; facility to accumulate invoices in a print file for end-of-day printing; commission analysis report; and sales tax report.

**Stock Control** The Satchel Stock Control Module provides the following features: optional integration with the Invoicing/Credit Note Entry Module; ability to operate as a standalone module; 10-character alphanumeric stock code; stock movement report; re-order level report; automatic price increases by use of cost percentage; price calculation by product or product group; stock variance reports; and stocktake forms.

**Sales Reporting** This module provides

SBT Database  
Accounting Library

# FREE

## FEATURE DISK AVAILABLE

Do you often hear yourself say:

"I like it except ..."

If this is the case then why not join 120,000 users in 70 countries who are not experiencing that problem.

Don't be locked in — the accounting software you can change! SBT source code in a box offers you total flexibility as your business expands.

Written in the world's most popular database manager, dBASE III PLUS.

A limited number of dealerships are still available.

Opportunities exist for program customisers in all States.

Write or phone for more information.

Name

Company

Address

Phone

☐ Dealer

☐ Customiser

☐ End user

P.O. BOX 474  
SPRING HILL, QLD 4004  
PHONE (07) 832 6180  
FAX (07) 832 6131

**SBT**  
AUSTRALIAN SOFTWARE

## At a glance

**Satchel**

**Supplier:** Abacus Software

**Tel:** (03) 429 5844

**Price:** Single-user, \$795; two users and two printers, \$995; three users and three printers, \$1195.

**Requires:** 140k RAM, PC-DOS/MS-DOS/Xenix.

**In short:** The Satchel Business Software pack is best suited to the small business environment. Even though online help is not available, Satchel is easy to use and has been designed with the non-technical user in mind.

# A JUMP AHEAD IN ASSET CONTROL!

How would you like a microcomputer fixed asset software system that

- keeps separate book, tax and insurance records for each asset
- revalues book and insurance values automatically with indices or ad hoc
- provides a choice of four book depreciation methods plus three for tax
- permits unlimited depreciation rate changes
- calculates book and tax profit or loss on sales including 57AF luxury car allowance and capital gains tax automatically,
- allows full or partial transfer of assets
- generates over 100 standard accounting and tax reports by any combination of company, department, cost centre, asset type or lets you design your own
- sends reports to the screen, printer or to disk
- combines with an internationally recommended lease accounting system to give full management information on leased and purchased assets
- maintains a complete audit trail
- includes multi-level security
- prints labels for your asset inventory, plus a lot more?

And do you want this system to run on any Industry Standard microcomputer like the NEC PowerMate 1SX, single or multi-user?

And have all this for less than \$3,000!



Search no more - ASSETCAT 2 from CATSOFT is here!

ASSETCAT is another power product from CATSOFT, the team of chartered accountants recommended by the Australian Accounting Research

Foundation and the Institute of Chartered Accountants in England and Wales.



AUSTRALIAN ACCOUNTING  
RESEARCH FOUNDATION  
SPONSORED SOFTWARE



## YES

- ☐ Please send me more information on ASSETCAT 2
- ☐ Please contact me as I would like to see ASSETCAT 2 demonstrated.

- ☐ Please send me information on the complete range of Catsoft Accounting Software Solutions.

Name: \_\_\_\_\_

Position: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

Postcode: \_\_\_\_\_

Phone: \_\_\_\_\_

## CATSOFT

CONTEMPORARY ACCOUNTING & TAX SOFTWARE  
A Division of United Computer Group Ltd.

45 Albert Street, Abbotsford, Vic. 3067.

Ph: (03) 429 3111. Fax: (03) 428 5245.

SYD: Ph: (02) 649 1222. Fax: (02) 649 2022.

Magnum Opus 1735

APC November 1988 Page 185



monthly sales reports. If required, reports may be printed before the month-end. The available reporting options include: product sales report; product by customer sales report; customer by product sales report; and sales transactions report.

## Conclusion

The Satchel Business Software pack contains the essential features of a basic accounting package, with its main advantages being ease of use and low-cost multi-user capability.

However, since the Satchel package requires duplication of data entry and does not provide full modular integration, its functionality is limited to the small business environment.

## SunSystem's Financial Software

The SunSystems range of financial software was designed to run on large machines (eg, DEC VAX) and was adapted to run on microcomputers. As a multi-user package it runs on Xenix (under Xenix V on IBM PC/ATs and compatibles), Unix (under Unix System V on

Altos xx68, AT&T 3B, IBM RT 6150, NCR Tower and Sperry 5000 Series computers). It also runs on the DEC VAX under VMS.

SunSystem is quite unusual in structure. The General, Debtors and Creditors Ledgers are combined into one file (with a separate file for budgets) rather than the usual segregation. A single set of input and maintenance routines processes actual and budget records depending on which mode is selected. The budgets are treated as future transactions and the file is structured in the same way as the actual transactions file.

The user is presented with a large main menu which allows direct access to all the main ledger functions. The user needs to type in both a password and an identity code to gain access to the system and the system manager can impose restrictions on individual operators, specifying which databases, ledger accounts and menu functions they may use.

The documentation is quite comprehensive with a Reference Manual, Tutorial Manual and a Demonstration Database of all screens and menus in the system. However, the manuals would be improved by the addition of a

table of contents and index.

Information can be imported and exported from the SunAccount System. Export files can be created for WordStar, dBASE, Supercalc, Lotus, Multiplan and Financial Control System (FCS). The input procedure accepts batches of records into the transaction files from the associated SunBusiness package. The incoming records are validated and listed and may be posted to actual or budget transaction files. Any debit/credit discrepancy within the batch of records is converted into a further transaction and posted to a suspense account.

## Review of modules

**SunAccount** (General Ledger — including Debtors and Creditors Ledgers). The SunAccount Ledger is composed of the actual transactions file and the budgets file. A single set of input and maintenance routines process actual or budget records, depending on which mode is selected. Groups of single-entry transactions are made to debtor, creditor, profit and loss and balance sheet accounts via journals containing an unlimited number of transactions. The transaction screen displays the current credit/debit balance for the page and the

## BOOKMATE ACCOUNTING SYSTEM

*Why pay hundreds of dollars for complex Installations ?*

**BOOKMATE ACCOUNTING SYSTEM** includes :-

**CASHBOOK, PROFIT and LOSS STATEMENT, BALANCE SHEET, GENERAL LEDGER, TRANSACTION JOURNAL.**

Available for **IBM XT/AT and Compatibles** and ideally suited for Small Businesses, Schools, Clubs, Home Accounts, and Budget Monitoring.

### FEATURES

- \* Single Entry Cashbook; Double Entry Processing
- \* Move Funds between any Account
- \* User defineable Chart of Accounts
- \* Constant monitoring of Bank Balance
- \* Full year's history in the General Ledger
- \* Uses a standard printer and normal computer paper
- \* No printer codes to be installed
- \* All reports viewable on the screen prior to printing
- \* Manual supplied, learn in two hours
- \* After Sales service and support - of course !
- \* NOT copy protected

**BOOKMATE ACCOUNTING SYSTEM** - designed for the NON-TECHNICAL user, is self teaching, and, you get **INSTANT** results.

Reduce your Accounting fees at Tax time.

**BOOKMATE ACCOUNTING SYSTEM**  
(Australian design)

**\$156-00** (incl. Sales Tax)

Sales, Enquiries, Sample Reports

**ANN COURT COMPUTER SERVICES**  
6 Ann Court, ASPENDALE, VIC. 3195  
**TEL: (03) 580 6424**

## ACCOUNTING SOFTWARE

Distributors • Manufacturers • Importers/Exporters

# Don't wait for the DP Department

## to organise your software

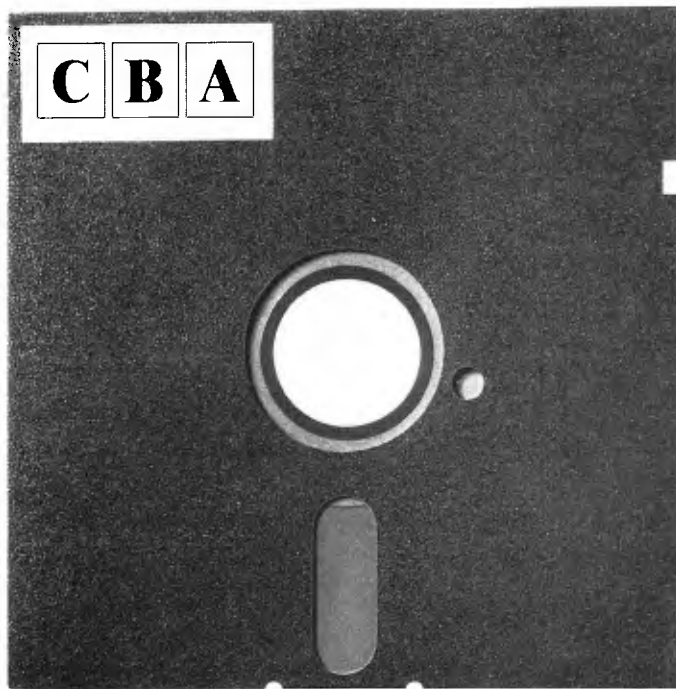
If you want a single or multi-user system  
• multi company • multi warehouse • fully integrated • multi currency • shipment costing  
• asset register, then you need

the  officer

CONTACT

# MCS (02) 387 4533

Suite 1603, Bondi Junction Plaza, Bondi Junction NSW 2022



**IF YOU WANT YOUR BUSINESS RUNNING AT ITS BEST,  
STAY TUNED TO THIS PROGRAM.**

Businesses make money,  
and lose money,  
by the way they handle  
money.

How well is your  
accounting operation  
handling it?

Whatever your answer,  
your operation  
can always be improved.

This is what CBA  
from Automation One  
does. In over 2500  
Australian Companies.

CBA is a software  
package that tunes up  
your  
accounting procedures.

It offers  
accounts receivable,  
inventory control,  
order entry, accounts  
payable,  
general ledger, cash book,  
bill of materials,  
point of sale, cost  
management,  
data transfer, payroll,

purchase orders, special  
pricing and fixed assets.  
All at easy access.

No stone is left unturned.

There  
could be money under it.

So if we've  
got you thinking about  
how much better  
your financial controls  
could be, call  
the Automation One team  
on (008) 331 198  
or (03) 696 2635. We're

in most capital cities.

Or fill in the coupon.  
Tell me more about CBA  
by sending information to:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Postcode: \_\_\_\_\_ Tel.: \_\_\_\_\_

Send to: Automation One Pty. Ltd.

27 Palmerston Cres., Sth. Melbourne

3205, Victoria.

**AUTOMATION ONE.**

We help you work smarter,  
not harder



# FEATURE

|                                             |  |                                                        |                           |
|---------------------------------------------|--|--------------------------------------------------------|---------------------------|
| SunAccount<br>Ledge Accounting<br>MAIN MENU |  | Database<br>Period 02/81<br>Operator DAU Date 28/02/81 | DEMONSTRATION SYSTEM      |
| TRANSACTION ENTRY                           |  | REFERENCE MAINTENANCE                                  | FINANCIAL REPORTS         |
| JE Journal Entry                            |  | CA Chart of Accounts                                   | FS Financial Statements   |
| JS Journal Spread                           |  | NA Names & Addresses                                   | FA Financial Analysis     |
| AA Account Allocation                       |  | BK Bank Details                                        |                           |
| JI Journal Import                           |  | CU Conversion Tables                                   | DEBTOR/RECEIVABLE REPORTS |
|                                             |  | NC Analysis Codes                                      | AD Aged Debtors           |
|                                             |  |                                                        | DT Debtor Transfer        |
| INQUIRIES                                   |  |                                                        | CREDITOR/PAYABLE REPORTS  |
| AQ Account Inquiry                          |  |                                                        | AC Aged Creditors         |
|                                             |  |                                                        | GP Generate Payments      |
|                                             |  |                                                        | CT Creditor Transfer      |
| LEDGER REPORTS                              |  | SYSTEM MAINTENANCE                                     | DOCUMENTS                 |
| JL Journal Listing                          |  | NP New Period                                          | PS Print Statements       |
| AL Account Listing                          |  | CB Change Budgets                                      | PR Print Remittances      |
| TB Trial Balance                            |  | PC Period Cleardown                                    |                           |
| LR Ledger Revaluation                       |  | UR View Stored Report                                  |                           |
|                                             |  | SU SetUp Menu                                          |                           |
| Selection < > X=Exit from Ledger Accounting |  |                                                        | Version 3.0.              |

*SunSystem's main menu allows direct access to all the main ledger functions*

overall journal. The latter must be zero before the journal is accepted for posting.

The user can define any number of journal types for different transactions and automate the process. If the user wishes to leave a journal, the system saves it and recalls it automatically when he/she next enters that transaction mode. This is particularly useful when there is a query or an urgent task, or a new code is to be added to the reference file.

Reports and enquiries are produced by analysing the indexed transaction files. You can define up to five analysis categories for accounts, transactions and addresses, which are used for reporting and enquiry. The Chart of Accounts has one record per account, defined with an account type of debtor, creditor, profit and loss or balance sheet, and identified as open item or balance forward. There is a 10-character account code, a description of 30 characters and a second name of up to 10 characters for the look-up facility.

The optional Multi-currency and Time Recording Module of the SunAccount system can also be purchased as a separate system. The module converts foreign currency to base currency and vice-versa when the transaction is entered. Conversion tables can be set up or different rates can be specified during manual entry. With the option installed, all the ledgers are multi-currency and the number of currencies in each ledger is unlimited.

The Time Recording application uses the same type of conversion tables to

convert time into an amount of money or vice-versa. The tables may contain different rates for different types of accounts, or different periods. The number of time rates is unlimited within each ledger and account, and the statement to the debtor may show such information as time spent in addition to cost.

**SunBusiness** (Order Entry, Invoicing and Stock Control) SunBusiness is similar in operation to SunAccount. It has the same main menu method of indicating options to the user and is

designed to let the operator make a variety of enquiries into customer and stock details, and to view transaction histories.

Acknowledgements, despatches and invoices can be printed. Printing of Sales Order transactions includes the facility for items to be flagged as being available in stock. Detailed analysis reports can be produced and the system handles special prices for individual customers, as well as discounts and surcharges. SunBusiness allows the operator to access information on the screen for quick enquiries about customer or product status. It is also possible to print out product lists and customer address lists.

Invoices and stock movement details recorded in SunBusiness can be transferred into SunAccount for further processing. The invoice and inventory systems can both be purchased separately (called SunInvoice and SunInventory respectively).

**SunTrend Multi-dimensional Modelling** This is a modelling tool which allows the user to incorporate up to 40 dimensions in the model. SunTrend links into the other SunSystem's modules to facilitate departmental analysis reports and financial planning. The user selects data for display, such as particular products sales departments and regions.

## Conclusion

SunSystem's Financial Software is a new range of software on the Australian market. It has many attractive features and is available on a wide variety of microcomputers as well as the DEC VAX.

With the multi-currency option and the ability to do sophisticated financial modelling, reporting and analysis of financial transactions, this package has been used by a number of the world's largest organisations and international banks.

The package is at the premium end of the microcomputer accounting market and is worth considering, especially if multi-currency transactions are required.

## Jewel

Jewel has been developed over the past three years, with a major revision and rewrite in early 1988. It is one of many Macintosh packages written in the Omnis 3+ database development system.

The manual did not include any general information on accounting or

## At a glance

**SunSystem's Financial Software, version 3.0**

**Supplier:** ACSI International

**Tel:** (02) 957 2233

**Price:** SunAccount single-user package, \$2000; multi-user upgrade, \$2000; optional Multi-currency and Time recording module, \$2000; optional Fixed Asset module, \$2000; SunBusiness, \$3500; SunTrend, \$2000.

**Requires:** IBM compatible under PC-DOS or MS-DOS version 3.0 or later with 384k memory and a hard disk; operates on IBM PC network with MS-NET, IBM Token-Ring, 3COM and Torus ICON/Tapestry; Xenix V; Unix System 5 and DEC VAX under VMS.

**In short:** A package recently introduced to the Australian market. It is a comprehensive, adaptable and easy-to-use financial management system.

# ZERO WAIT STATE 20 MHz

Yes, Genuine 20 MHz at zero wait state. The AIS-286PHQ computer uses the NEAT (New Enhanced AT) Mother Board. An 80286-16 CPU along with IMB Ram gives a Norton SI Reading of 23. Memory Ram may be 256K or 1M Chips giving up to 8MB on board. Today you don't want to spend a fortune in purchasing a Computer to find out that you have outgrown it in a few months due to new memory hungry software being released all the time. At least with AIS-286PHQ, you will be able to just plug in extra chips to cater for your future needs.

Standard features are IMB on board and compatibility to run DOS, OS/2, UNIX, and LIM EMS features 4.0D built in. Phoenix Bios and C & T Neat Chipset provides page interleaved memory, Shadow Rom for Bios and Video to improve performance. FDD/HDD controller handles 2 floppy drives and 2 large Capacity Hard Disk Drives of various Configurations. Dual Video Card provides Hercules Graphics as well as 16 Colour Shades on TTL Monochrome Screen. 2 serial, 2 parallel and 1 joystick gives you plenty of ports. A nicely presented Tower Case with Speed Display and 200W power supply completes one of the finest, best-backed compatible systems money can buy. Every AIS-286PHQ is fully assembled, burned-in and tested in our Lab and many options are available to suit your needs at best prices.

We would like to build one for you. We think you'll agree, this is the very best computer money can buy.

High Speed, High Performance and High Quality is waiting for your application. File Servers, Multi User, CAD/CAM, Desktop Publishing can now be performed at top speed. No need to sit and wait for that large CAD drawing to "Redraw" or that large spreadsheet to "Recalc". Time is Money and AIS-286 PHQ will save you money.

Just drop in for a cup of coffee or tea with our friendly staff and see Technology at its best. Interstate and NZ orders call Mr. Louis Belcourt on (03) 579 0244.

## AIS-286PHQ

20MHz  
NEAT 80286-16  
IMB RAM  
(up to 8 MB on Board)  
1.2 FD  
2 x SFR/2 x PAR/1 JS  
GREEN TTL SCREEN  
42 MB (28 MS)  
**\$3690**

## AIS-386 XHQ

30 MHz  
80386-20  
2 MB RAM  
(up to 8 MB on Board)  
1.2 FD  
2 x SER/1 x PAR/1 JS  
GREEN TTL SCREEN  
42 MB (28ms)  
**\$5999**

## VGA GRAPHICS

VGA (800 x 600) & Screen. **\$1490**  
VGA (1024 x 768) & Screen **\$1790**

INCLUDES ★ MULTIPLE FONTS  
★ HOT KEY  
★ HOT ZOOM  
★ MANY DRIVERS

## AIS ACCOUNTING SOFTWARE

We also can provide you with a complete, fully Integrated Multi User, Accounting software. Version available to suit Accountants, Retail, Wholesale, Point of Sale, Manufacturing, Service Industries, Medical Clinic and more.

## THE VERY BEST OF COMPUTER, SOFTWARE, SERVICE AND SUPPORT



**(03) 579 0244**  
**ARTIFICIAL INTELLIGENCE SYSTEMS PTY LTD**  
174 Warrigal Road, Oakleigh, Vic. 3166  
Fax (03) 563 8210  
IMPORTERS, WHOLESALE, DISTRIBUTORS  
DEALER INQUIRIES WELCOME

COMPLETE COMPUTER SERVICES  
CONSULTANT, SYSTEM DESIGN,  
PROGRAMMING, TRAINING, MULTI-USER  
NETWORKING



File Edit JCS Debtors Stock Creditors Cash Gen Ledger Action

Stock : Product Details

Code CF100  
Description 100Kg Fertilizer

Grp COMM Commercial Garden Supplies

Supplier BLACK BLACKMAN & ROBERTS

|            |        |            |        |
|------------|--------|------------|--------|
| Unit Qty   | 1      | Prev Stock | 12     |
| Unit Desc  | BAG    | In Stock   | 1012   |
| Cost \$    | 95.00  | On Consign | 0      |
| Price 1 \$ | 140.00 | Reord Pt   | 2      |
| Price 2 \$ | 0.00   | Max Stk    | 50     |
| Price 3 \$ | 0.00   | Min Order  | 10     |
| Price 4 \$ | 0.00   | Lead Time  | 5 Days |

Last Inv 19 FEB 88  
Last Pur. 28 MAR 88

Location

*Much information can be stored when creating and maintaining stock records*

systems implementation (apart from a few points where it suggested that your accountant be consulted), or an index. However, there were plenty of screen shots and excellent checklists. A more comprehensive manual, which will include an index, is currently in the pipeline and, according to Jorgen Computer Services, should be ready by the end of the year.

Three levels of password security are available — data entry (transactions, statements), data management (journals and month ends) and financial management (budgets, analysis reports and year ends). This seems to be an efficient method of managing security in the system.

As noted above, Jewel was developed using Omnis 3+; therefore, it generally follows the Apple user interface guidelines. The only time an experienced Mac user might be surprised is when an attempt is made to use Shift-Tab to move back to the first field in a dialogue box — it doesn't work.

Entry of invoices, credit notes and journals requires either a good memory of account codes or a list close at hand. We discussed this lack of convenience with Jorgen Computer Services, who explained that the inability of Jewel to search for account codes is related to its parent language Omnis.

Another inconvenience is the frequent appearance of the message 'Lost Screen Position. Please reselect option from Main Menu'. Jorgen Computer Services advised that this is due to a problem in Omnis which has been rectified in the latest release.

## Review of modules

**General Ledger** There is no dedicated report writer in Jewel; instead, flexible reports are created by thoughtful use of the General Ledger Structure. It has three types of accounts — title accounts, posting accounts (which function like normal accounts) and summary accounts (which add posting accounts). These can be nested to any number of levels.

Jewel is excellent in its handling of transaction timing. Journals do not have to be related to the month currently open — they can have any date. Also, the general ledger can be open for two years, which allows ample time for end of year adjustments.

The General Ledger Module and the Cash Module can be used by some businesses as a simple standalone system to produce excellent reports. At \$800, users such as property developers, trust managers and small businesses might find this an effective solution.

In relating to the general ledger, the debtors, stock and creditors ledgers are true subsidiary ledgers. Transaction summaries are transferred to the general ledger. This saves on disk space and means that only a limited amount of detail is available in general ledger reports.

Reports from all modules can be displayed on-screen, printed or dumped to a SYLK file for incorporation in an Excel spreadsheet or to a 'comma delimited' file for use in Microsoft Word.

**Accounts Receivable** Accounts Receiv-

able can be critical to a medium-sized business. Transaction histories can be listed by type, reference number, customer or date. A bank deposit slip can be printed as often as necessary.

There are three approaches to creating an invoice in Jewel, and the way the invoice is created determines the level of detail that sales analysis can go to. The first type is 'product coded', where the individual code for each product item is entered and the corresponding product description is selected. This allows sales analysis to be performed at the most detailed level. The second type is 'product grouped', where the user enters a grouping code, then a description of the product. This allows sales analysis to be performed at a group level and enables a greater degree of flexibility on the invoice. The third type is 'free form', which only demands a general ledger code, and allows the user to type any description.

**Accounts Payable** The Accounts Payable Module includes cheque printing and produces a good range of useful reports, such as Transactions Listings (by type, reference number, supplier or date), Payments Due, General Ledger Allocation, Remittance Posting, Aged Listing, Full Ledger Details, Control Listing, Supplier Listing and Creditors Analysis (monthly purchases or last activities).

The Accounts Payable Module gives a similar choice for supplier invoices to the accounts receivable module: free form, product grouped and product coded, with similar benefits.

**Stock** Creating and maintaining stock records in Jewel is simple, and the package captures much information which is useful to the running of a business, especially where inventory levels impact significantly on cash reserves. Features of the Stock Module include full reordering information and comprehensive

## At a glance

### Jewel

**Supplier:** Jorgen Computer Services

**Tel:** (03) 241 0444

**Price:** \$1950 for all modules or \$700 for Debtors, Stock or Creditors and \$800 for both General Ledger and Cash.

**Requires:** Macintosh Plus, SE or II with one 800k floppy and 10Mbyte of hard disk space.

**In short:** A solid accounting package with well thought-out features for small to medium businesses in single and multi-user environments.

LAST YEAR TWO LEADING EUROPEAN PC MAGAZINES SELECTED TANDON  
PAC 286 AS THE BEST AT - COMPATIBLE COMPUTER

# Tandon

THE GOLD-WINNING CHOICE



**TANDON TARGA 20 PLUS**  
FULLY CONFIGURED  
MONO SYSTEM \$4,050  
40 MB TARGA \$5,030 (INC. TAX)

- 80286 8/10 Processor MHz Switchable
- One 1.2 Mb Floppy drive
- Clock/Calendar W/Battery
- 1 Mb Ram
- Memory mapper for Lotus
- 5 Expansion slots
- Serial/Parallel ports
- SMALL Footprint design
- Dos 3.2, Microsoft windows, GW Basic
- 20 Mb Winchester drive (50 ms)
- 101 Keyboard



**TANDON PCX2**  
FULLY CONFIGURED  
MONO SYSTEM \$1,997 (INC. TAX)

- 4.77 MHz
- 256 K Ram
- 7 Expansion Slots
- 101 Keyboard
- Parallel/Serial ports
- Two 360 KB Floppy drives
- MS-Dos, Basic

**PAC 286 PLUS**  
FULLY CONFIGURED  
MONO SYSTEM (INC. TAX) \$7,266



**THE DEFINITIVE PERSONAL DATA PAC COMPUTER**

- 80286 8/10 MHz Processor
- Two Data Pac Receptacles
- Two 30 Mb Removable Data Pacs
- 1.2 Mb Floppy Drive
- 1 Mb of Ram
- Memory Mapper
- 5 Expansion Slots
- Small Footprint, Tower or Desktop
- Dos 3.2, Microsoft windows.  
(Already installed)
- Parallel/Serial Ports




**THE TANDON AD-PAC \$1,500 (INC. TAX)**

The AD-PAC makes it easy to share software and data between your IBM XT, AT, PS/2 or compatibles. The ultimate device giving the user access to the Data Pac technology.

- AD PAC external receptacle
- Controller card & cable
- Installation software and manuals
- Four versions available: AD PAC/X, AD PAC/A, AD PAC/P and AD PAC/U



**TANDON 386**  
FULLY CONFIGURED MONO  
SYSTEM \$14,700

- Intel 80386 Processor, 20 MHz.
- 1.2 Mb Floppy Drive
- 112 Mb Winchester Hard Disk (Fixed)
- One Data Pac Receptacle
- 2 Mb of Ram
- Parallel Serial Ports
- 8 Expansion Slots
- 101 Keyboard
- Dos 3.2, Basic, Microsoft windows



**THE PERSONAL DATA PAC**  
\$1,000 (INC. TAX)

## THE PRODUCT THAT STARTED THE DATA PAC REVOLUTION

The first truly removable and totally portable hard disk drive ever.

The most effective data security system ever invented the PDP is also fast, portable and very rugged.

- 3.5", 30 Mb Winchester Drive
- 27 Ms access speed
- 4 high capacity shock absorbers
- Rugged steel frame
- ABS plastic casing

## Tandon BETTER, SAFER, PORTABLE

CANBERRA: (062) 68 3132

MELBOURNE: (03) 419 3033  
PERTH: (09) 470 1443  
HOBART: (002) 34 4522  
ADELAIDE: (08) 362 7388

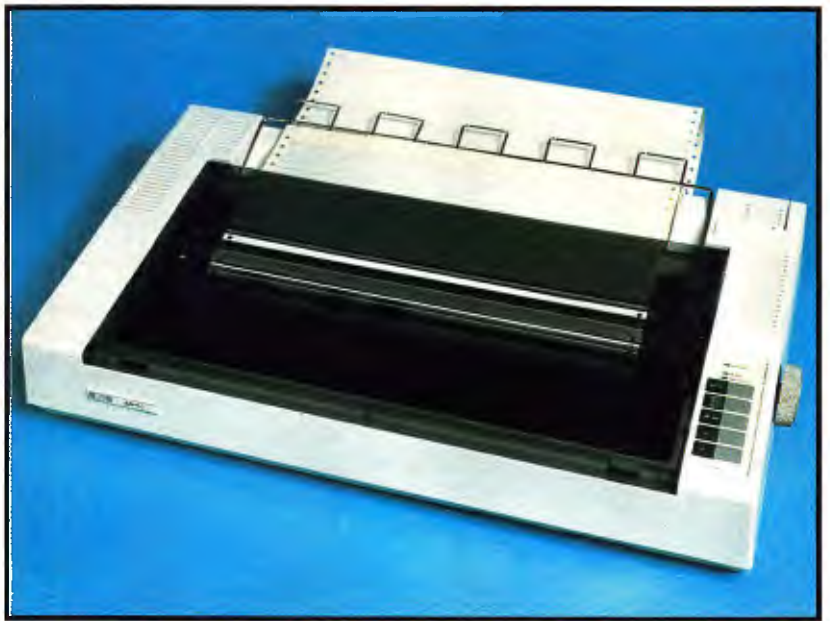
**DEALER ENQUIRIES CALL (02) 888 9444**



# If you're printer-smart, you'll "Get Nakajima(ed)"

Hook the Nakajima AR55 up to your PC and things start to happen.

Good things like super-crisp printing. Presentation perfect, stylish printing. And you don't need a PhD. in Computer Science to use the AR55 either.



So, if your current old clunker should be sent to the knackery (where all old and tired printers go), team up with Nakajima. Together you'll make great printing.

---

**Nakajima AR 55 Specifications:**

\* Fully featured 9-pin dot matrix printer. \* 136 column - 15 inch width. \* 200 cps draft mode (240 cps in 12-pitch). \* FX 80 and Proprinter emulation. \* Built-in pull tractor. \* Courier font standard, others available on font cartridges.

---

Dealer enquiries to Sole Australian Distributor

**FORMULA**  
**SYSTEMS PTY. LIMITED**

(Incorporated in N.S.W.)

5-7 Mobbs Lane, Carlingford, 2118.

Tel. (02) 858 5322.

Fax (02) 804 6865.

## FEATURE

budgeting, and integration with the other modules.

Reports available provide stock levels, reorder quantities, stock movement, valuation and a stocktake printout which leaves space for the counted quantities.

### Conclusion

Jewel is a powerful accounting package that takes advantage of the features of the Apple Macintosh.

The small problems noted are being addressed by responsive suppliers and the fact that the package is supported by Peat Marwick Hungerfords means that Jewel is supported in depth.

Jewel can be recommended to manufacturers, service industries, distributors, wholesalers, retailers and professionals who do not require an integrated payroll system, and are looking for a solid, well supported Macintosh-based accounting system.

### Last Accounting System

Last is one of the best-featured and most flexible accounting packages currently available for the Apple Macintosh, being developed over the last three years and with an installed base of around 90 sites. Each manual is a slim, wirebound volume with an excellent index (apart from the tutorial, which has no index or table of contents). The first section of each manual is titled 'You Already Know How to Use this Package!!!', pointing out that Macintosh packages generally work in a similar manner. And Last is no exception.

Experienced Mac users will generally be quite at home in Last except in one area: the input forms look like dialogue boxes but do not work like dialogue boxes; the Return key moves between fields in the way Tab should, rather than operating the default button, so often a mouse click or the Enter key is needed to finish off a form.

Last is capable of 'learning' the most frequently used account codes. One press of command-period enters the most commonly used account code, while the second press enters the second most commonly used code and so on. A feature we found more useful is the ability to create customer accounts, or even general ledger accounts, while in the middle of invoice or other transaction entry.

### Review of modules

**General Ledger** General Ledger, or 'nominal ledger' as it is called in Last, is

The screenshot shows the 'Payment Received' screen with the following data:

|                  |         |                                                                             |                                                                                         |
|------------------|---------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Customer Number  | JONES   | Customer Name                                                               | Jones & Jones                                                                           |
| Transaction Date | 31/8/88 | Receipt Ref                                                                 | 54525555                                                                                |
| To Bank A/C      | 10-750  | Description                                                                 | Receipt                                                                                 |
| Discount Allowed | 0.00    | Allocation Type                                                             | <input checked="" type="radio"/> Selected Invoices <input type="radio"/> Oldest Invoice |
| Amount Received  | 1500.00 | <input type="radio"/> Selected Period <input type="radio"/> Do NOT allocate |                                                                                         |
| Total            | 1500.00 |                                                                             |                                                                                         |

Below this is the 'Outstanding Invoices' table:

| Date    | Invoice No | Inv. Total | Amount O/S | Disp                     | Allocated |
|---------|------------|------------|------------|--------------------------|-----------|
| 7/7/88  | 54333      | 1200.00    | 0.00       | <input type="checkbox"/> | 1200.00   |
| 14/7/88 | 54334      | 800.50     | 500.50     | <input type="checkbox"/> | 300.00    |
| 21/7/88 | 54335      | 543.66     | 543.66     | <input type="checkbox"/> | 0.00      |

At the bottom, the 'Sales Ledger' screen shows:

**Sales Ledger**  
**ABC Company Pty Ltd**  
 Month: April Run Date: 31/8/88  
 To be Allocated: 0.00

*The sales ledger can be kept separate from the general ledger, or automatically integrated*

comprehensive, powerful and flexible. In fact, its flexibility is probably the most compelling reason to select a package with this kind of sophistication. The general ledger parameters section allows the user to set 12 or 13 periods per

solidated if necessary. Each general ledger account can be either open item or balance brought forward at year end, depending on the nature of historical information required. Automatic postings can be set up: in this system they are known as 'standing orders'.

The P&L and Balance Sheet can be modified and up to 10 other reports can be defined using the inbuilt report writer. Fields may be added, subtracted, divided or multiplied, and the results can be displayed as percentages. This means that Last can be a useful management tool in addition to simply handling the books.

**Sales Ledger** This module is as comprehensive as the General Ledger Module. There are too many features to mention them all, but I will describe one which indicates the thought that has gone into this package.

A feature which may be worth its weight in gold to management is the 'Pareto Analysis' report. This report is available for stock, debtors and creditors, and identifies for management the top and bottom performers by creating a list based on cumulative percentage.

The sales ledger can be kept separate from the general ledger, be automatically integrated, or integrated with an intermediate file interposed.

**Purchase Ledger** The accounts payable section is as impressive as the excellent General Ledger and Sales Ledger modules. Both manual and automatic cheques are supported, as are bank transfers and Autopay (a sys-

year, any one of these periods to be a year end, and a user-definable three-letter name for sales tax (for example GST in New Zealand or simply TAX in Australia).

The most interesting user-definable feature is a flexible ledger account breakdown. Up to three levels and eight characters are available, and there is the added flexibility of being able to use general ledger codes to achieve profit centre accounting.

Also available are two user-definable data fields, one for accounts and the other for transactions. These allow a further degree of analysis if used. Many companies can be processed and con-

### At a glance

#### Last Accounting System

**Supplier:** Data-Tech Systems

**Tel:** (03) 894 1177

**Price:** Single network installation, \$3995; individual modules, \$950.

**Requires:** Macintosh Plus, SE or II (with hard disk).

**In short:** A powerful, flexible package for small to medium-sized businesses in single and multi-user environments with excellent reporting capabilities.



## FEATURE

tem unique to the Bank of Westminster!). It would be nice if the Australian vendors could develop a similar feature for use with local banks.

The reporting in this module is of the same degree of quality as in the other modules.

**Stock Module** The only other Last module we reviewed was the Stock Control Module. This seems to be as sophisticated as the other modules, providing features such as stock assemblies, links with other systems, full integration with the other modules, WIP quantities for manufacturing users, internal transfer charges, and information management for reordering.

Other modules available include Accounts Payable, Accounts Receivable and Order Entry.

### Conclusion

Like most of the other packages reviewed, Last is capable of exporting data to other Mac applications such as word processors, spreadsheets and databases, allowing presentation of reports to be improved dramatically and further analysis to be performed.

While the Last accounting package works well in the Australian environment,

it still has a British flavour. Each module is excellent in its own right, and all the modules seem to integrate well. However, there is no payroll, costing module or provision for point of sale. Finally, there is no support for multi-currency transactions.

Last was certainly the most powerful and flexible of the Mac accounting packages reviewed. By taking advantage of the Mac user interface, it was no more difficult to use than simpler systems with less functionality. Last compares well with accounting packages running under other operating systems in terms of features, speed and flexibility.

### Sybiz MacLedgers

MacLedgers is a single-user accounting package suitable for small to medium-sized businesses. The manual is one of the best I have read and includes instructions on accounting and bookkeeping, mixed with instructions on how to use the package.

When you launch the application, you are faced with icons of four books, marked 'Sales Book (Debtors)', 'Purchases Book (Creditors)', 'Inventory Book (Stock Control)' and 'Ledger Book (General Ledger)'. Clicking on one of

these books 'opens' it. Each book can be divided into sections, and each section into pages. Each page is home to up to 34 accounts. This organisation allows the user to group accounts in whatever scheme is required.

### Review of modules

**General Ledger** This module is implemented as a ledger book in MacLedgers. Each section in the 'book' can be an asset, expense or other type type of account. Profit and Loss Statements and Balance Sheets are constructed on this basis. Account numbers are not required, but can be used if they will make things easier and more familiar for the user.

In addition to debit and credit journal entries, there are also cash payments and receipts transactions. Use of cash transactions only will give a very simple but effective cash accounting system for the smallest of businesses. MacLedgers will not allow the user to exit the application until the journals balance.

Reports available are chart-of-accounts, trial balance, profit and loss, balance sheet and transaction history. There is also a neat little window which pops up to instantly give you stock turn-

## creative computing

*If you're feeling overwhelmed...*

*...maybe we can help*

Control fully integrated software comprising:

Suitable for retail and wholesale.  
One or many locations

- INVENTORY
- ORDER ENTRY
- INVOICING
- PURCHASING
- RETAIL POINT OF SALE
- SALES ANALYSIS
- DEBTORS
- CREDITORS
- GENERAL LEDGER
- \* TOYS \* TIMBER SUPPLIES
- \* HARDWARE
- \* GREEN GROCERS
- \* AUTOMOTIVE ACCESSORIES
- \* SPORTING GOODS
- \* STATIONERY \* PRODUCE
- \* SPECIALTY STORES
- \* ETC. ETC. ETC.

**Creative Computing Pty. Ltd.**

**958 9417**

115 Sailors Bay Road Northbridge.



**SATCHELS  
WALK  
OUT THE  
DOOR!**

Simply the best  
Accounting Software for  
Australian small and  
medium sized business.

#### FEATURES:

- Invoicing/Credit Notes •
- Accounts Receivable •
- Stock Control •
- Sales Reporting •
- Accounts Payable •
- General Ledger •
- Outstanding ease of use •
- Multi user version runs under DOS with dumb terminals •



SINGLE USER USUALLY  
\$795  
NOW ONLY

**\$495**

INC S/TAX.

2 users + 2 printers for

**\$995**

3 user + 3 printers for

**\$1195**

Abacus Software 512 Bridge Road, Richmond, Vic. 3121 Tel: (03) 429 5844 Fax: 429 4780

Sextant 442



**QUALITY AUSTRALIAN  
MODEMS AT  
WAREHOUSE PRICES**

## NOW SAVE EVEN MORE ON THESE OUTSTANDING MODEMS

Avtek, the longest established Australian modem manufacturer, now gives you a chance to get even better value when you buy. Purchase any one of our modems before December 31st and you can purchase a Cybersoft Gateway V3 High Performance Communications Software Package for ½ price @ \$75.00. Just check the features and the prices of Avtek and you'll see why it's the modem chosen by more and more PC users.

**MEGAMODEMS  
NOW FROM  
ONLY \$325  
(INCLUDING 12-MONTH WARRANTY)**

**½ PRICE  
CYBERSOFT 3 GATEWAY  
COMMUNICATIONS PACKAGE  
Only \$75.00  
WITH ANY MODEM PURCHASED BEFORE  
DEC 31**

**MINIMODEM II  
VALUE AT \$179  
(INCLUDES 3-MONTH WARRANTY)**

More compact and reliable than most and suitable for data transfer between PCs, on-line services, E-mail and all videotex facilities like VIATEL (Model 123 only). Available as a standalone RS232 model or as a plug-in true ½ card for IBM PCs and compatibles.

A fully automatic operation,  
HAYES-compatible smart modem.



|                                             |     |
|---------------------------------------------|-----|
| Choose from 3 models (internal or external) | \$  |
| model 21/23 300/300, 1200/75                | 325 |
| 12 300/300, 1200/1200                       | 325 |
| 123 300/300, 1200/1200, 1200/75             | 399 |

Specifications:  
Data Standards —  
CCITT V.21 (300/300  
baud full duplex).  
Data rates — CCITT V.23  
(1200/75 baud).

**AN IDEAL  
FIRST MODEM!**



A highly reliable data communicator at a budget price. The compactly designed Minimodem II is supplied complete with Telecom-approved, push-button phone.

**PHONE NOW FOR FAST DELIVERY PH: (02) 888 5333**

All Avtek modems are sold complete with power supply, instructions and telephone connections. Designed and built in Australia, service and technical support for modems is available direct from Avtek Data communications.

**MAIL ORDERS WELCOME. AVTEK, P.O. BOX 651, LANE COVE 2066.  
30-DAY, NO-QUESTIONS-ASKED, MONEY-BACK GUARANTEE.**



**SEND COUPON TODAY!**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Name on Credit Card: \_\_\_\_\_

Credit Card No: \_\_\_\_\_ Expiry Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Please rush me

Qty Model internal/external price

|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|  |  |  |  |

Post to  
Avtek Data  
Communications,  
P.O. Box 651,  
Lane Cove  
2066.

Sub-total \$

Add freight \$

10.00

TOTAL THIS ORDER \$



# FREE OFFER



**FISCAL** accounting software for both the IBM PC and the Mac is taking Australia by storm.

Australian designed for Australian conditions, with fully integrated Debtors, Creditors, Sales Analysis, Inventory Control and full Profit and Loss reporting—with the power to manage up to 6 different businesses on a single PC—**FISCAL** is rapidly becoming the number one favourite across the nation.

Find out why **FISCAL** is so much better than the rest.

Simply complete the coupon or call 008 777 400 for your **FREE FISCAL** demo disk.

I'll BYTEL Please send me my FREE FISCAL Evaluation Disk and information on what FISCAL will do for me.

Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ Phone: \_\_\_\_\_

PC Code: \_\_\_\_\_  
 Computer: \_\_\_\_\_  
 Clip and mail to:  
**ARCOM PACIFIC**  
 PO Box 525,  
 Paddington  
 Q. 4064

## FEATURE

**Inventory View**

Code : 505  
 Title : PINE 25MMX75MM PLANO  
 Unit of Measure : M

|                     |      |                     |        |
|---------------------|------|---------------------|--------|
| Wholesale Price :   | 3.17 | Sales this Month :  | 63.40  |
| Trade Price :       | 3.42 | Sales this Year :   | 63.40  |
| Retail Price :      | 3.66 | Profit this Month : | -46.60 |
| Last in unit cost : | 3.05 | Profit this Year :  | -46.60 |

Quantity on Hand : 80      Qty. this Month : 20  
 Total Value : 440.00      Tax code : 4

| Date      | Ref. | Quant. | Details              |
|-----------|------|--------|----------------------|
| 01-Jan-88 | 1008 |        | 20 A & R ENTERPRISES |

*The inventory list of the Stock Control Module*

over, asset turnover and collection days ratios.

Running reports and month and year ends are all handled with the customary Macintosh ease of use. Data can also be dumped to spreadsheet files which can be opened by Excel.

**Accounts Payable** The Creditors section of MacLedgers functions in a similar way to the General Ledger. It is a book divided up into sections for analysis purposes. There are five types of transactions — purchase, payment, return of purchased goods, credit journal and debit journal.

Reports available include Creditor List, Mailing Labels, Transaction History, Balance List, Purchase Journal and Statements.

**Accounts Receivable** In the Debtors 'Sales Book', transactions available are cash sale, print invoice, enter invoice (for handwritten invoices), receipt, enter credit note, print credit note, debit journal and credit journal.

Reports available are Customer List, Mailing Labels, Sales Journal, Aged

Balance, at two levels of detail, Transaction History and Sales Tax Analysis.

Users of accounting packages based on other operating systems will find the method of entering data in MacLedgers unusual, however, it soon becomes second nature. It requires the use of three to five windows, depending on the options selected. Line items on the invoice are chosen from the inventory ledger either by leafing through then pointing and clicking, or by typing in part of the name of the stock item and doing a text search.

**Stock Control** The final module of MacLedgers is the Stock Control Module, which includes inventory list, re-order, price list, transaction history, sales and value, and stocktake reports. The transaction types available in the Stock Control Module are simple: goods inwards and goods outwards.

## Conclusion

Sybiz MacLedgers is a package that fulfills the promise of the Mac in the single-user accounting area.

There is, however, a long list of what it doesn't do. It cannot be expanded to multi-user, there is no support for order entry, costing, point of sale, cheque writing, flexibility in reporting (apart from the export to spreadsheets), or any type of standing journal.

MacLedgers is fully integrated, makes good use of the Mac interface and produces good looking reports. The documentation and ease of use is excellent. For what it does, it is very difficult to fault.

## At a glance

### Sybiz MacLedgers

**Supplier:** Sybiz Software

**Tel:** (08) 232 0600

**Price:** \$1495

**Requires:** Macintosh Plus, Macintosh SE or Macintosh II.

**In short:** A simple package with excellent presentation, suitable for the small to medium-sized business.

END

# GROUP ACCOUNTANTS

***Unleash the power of QUAD ACCOUNTING on your CORPORATE GROUP and reap the benefits***

- Automatic balancing of inter-company loan accounts.
- Your group can operate from just one bank account.
- Consolidation adjustments are generated automatically.
- Seamless integration of general and subsidiary ledgers, including debtors, creditors, investment and job-cost.
- You can span entries between different general and subsidiary ledgers.
- You can mix currencies and have automatic foreign currency translation.
- Optional multiuser capability and remote data entry modules.



MEGLAS is a powerful, flexible, high end accounting package for IBM compatible P.C.'s.

MEGLAS uses the revolutionary theory of **Quad Accounting** to significantly reduce the accounting workload for corporate groups.

You benefit from enormous time savings and ease of use.

MEGLAS is your advanced, professional solution.

For a complimentary information booklet, please contact:

Meglas Software Pty Limited  
14 Suffolk Street  
Paddington, N.S.W. 2021  
Phone: (02) 331 1316

*Fully supported throughout Australia*

WINNER OF THE AUSTRALIAN DESIGN AWARD

## TRY BEFORE YOU BUY ACCOUNTING SOFTWARE

EBA (Effective Business Accounting) is **more** than reliable, it's **proven** in some two thousand businesses.

EBA is **all-Australian**, designed specifically for business managers and operators who recognise the need for a fully-integrated accounting system as an essential management tool in a highly competitive world.

Whether you already own a PC or are considering purchasing one, see for yourself how effective **your** accounting system can be. Test-drive our EBA 'Prelude' version for only

**\$99**

Yes, — a fully working system with complete operating manuals and sample data files, for you to use and appraise in **your** environment.

Just fill in the coupon below and pop it in the mail today, or telephone for further information.

**EBA AUSTRALIA**

for

Effective Business Accounting

NSW ACT (02) 73 2269  
VIC TAS SA (03) 857 5780  
QLD NT (07) 844 2176  
WA (09) 474 1419

EBA Australia, Freepost No. 7  
P.O. Box 355, Concord West NSW 2138

Name: .....  
Company: .....  
Address: .....  
.....P/code.....  
Type of business: .....

Please send demo disk (free) ☐  
Send 'Prelude' (cheque enclosed) ☐



# PAINLESS WINDOWS

Windows. Data Entry. Menus.  
Finally, a C programmers' tool that makes  
them as easy to use as *printf()*.  
With Greenleaf DataWindows<sup>TM</sup>,  
you move in quantum leaps!

## Snazzy Window Treatments

DataWindows represents an important breakthrough in C programming tools. It sets you free so you can create exciting programs quickly and easily, saving both time and money! Developed to work with the IBM PC, XT, AT, compatibles, and MSDOS or PCDOS, DataWindows is a carefully tooled system of C functions which will jazz up your programs with unprecedented efficiency.

Greenleaf DataWindows is integrated windows, transaction data entry, pop-up, pull-down, and Lotus style menu systems with:

- **Screen Management.** You don't have to remember what's on the display or the sequence in which you put it there. DataWindows does the grunt work. There are no restrictions.
- **Transaction Data Entry.** Data entry windows can have any number of fields with sophisticated options for reading many data types. Calls are made to help, validation, and other functions. Full featured text editing, protected and mandatory fields, dBASE type picture strings, context sensitive help, validation of fields and transactions, redefinable keys, password entry, attribute control, keyboard idle and much more.
- **Device Independence.** It detects the type of display adapter your computer is using and adjusts to it automatically for CGA, EGA, or monochrome. Logical video attributes are easy to use for color or monochrome.
- **Compatibility.** Runs with Microsoft Windows and IBM TopView.
- **The Greenleaf Tradition of Quality.** Reliable products. Professional documentation that gets you up and running quickly and keeps you there. Reference card. Newsletter and Bulletin board.

IBM, Microsoft & dBase, are registered trademarks of International Business Machines. Microsoft Corporation & Ashton-Tate respectively. PCDOS, IBM PC, XT, AT, & TopView are trademarks of IBM; MSDOS and Microsoft Windows are trademarks of Microsoft Corporation.



## Stop Window Shopping

Order Today. Or call toll free for a free demo of the windows library that makes all the others obsolete.

Order any of these high performance tools by calling your dealer or FMS today. Specify compiler when ordering.

|                                 |       |
|---------------------------------|-------|
| Greenleaf DataWindows           | \$395 |
| The Greenleaf Comm Library v2.0 | \$325 |
| The Greenleaf Functions v3.0    | \$325 |



# FMS

95 Canterbury Rd,  
Middle Park, Vic. 3206  
Tel: (03) 699 9899.  
Telex: AA31604.  
Fax: (03) 699 7501.

Prices shown exclude Sales Tax and delivery. All major credit cards accepted.

## Window Dressings

- **Simple or Complex Windows.** Up to 254 powerful overlaid windows simultaneously, all with just one kind of window to remember! Yet any window can be from one character to 32K!
- **Easy Window Operations.** DataWindows lets you move, zoom, frame, title, change colors, titles, frames, size, location, and make windows visible or invisible at will! Functions set cursor, attributes, and write data to any window or "current window". Word wrap, auto scroll, keyboard functions.
- **Write to Any Window Any Time.** Windows may be visible, overlaid, or invisible, and you can write to them anyway. What you write will be seen when the windows become visible.
- **DataWindows is fast!** It writes directly to video memory (in some modes).
- **Easy to save!** Any window, complete with attributes, can be saved on disk quickly and efficiently.
- **Source code available. No royalties.**

## Also from Greenleaf:

### The Greenleaf Functions v3.0

The most complete, mature C language function library for the IBM PC, XT, AT and close compatibles. Includes over 225 functions — DOS, disk, video, color text and graphics, string, time/date, keyboard, disk status and Ctrl-Break functions plus many more.

### The Greenleaf Comm Library

Our 2.0 version is the hottest communications facility of its kind. Over 120 functions — ring buffered, interrupt driven asynchronous communications for up to 16 ports simultaneously with XMODEM, XON/XOFF, many many sophisticated features.

We support all popular C compilers for MSDOS/PCDOS: Microsoft, Lattice, Computer Innovations, Aztec, DeSmet, and others.



# Now we are six

***System Software Update 6.0 fixes some problems and improves the Mac's most basic software package. But as Jake Paden explains, it also raises serious questions about compatibility and bugs.***

The first thing you notice is the box. It's a lot bigger than that for System Software Update 5.0. Does that mean there's more to this release? Unfortunately, the answer is no. Except for better MultiFinder stability and some new files, there's not much here to attract you. The documentation is another story — stuff that Apple should have produced a long time ago.

When Apple released System Upgrade 5.0 late last year, it promised regular System software updates in the future. System Software Update 6.0 is Apple's next and most recent offering.

As with the 5.0 release, you can get it — if you want it or need it — in a variety of ways. You can buy a new Macintosh, and the new software will either be in the box or you'll be given a card that lets you get a copy from Apple. If you only require the software, you can buy the boxed System Software Update from an Apple dealer. Alternatively, you can take your disks into an Apple dealer and they will update it for you. As of upgrade 6.0, which has been available since August, customers are required to sign a licence agreement when updating or purchasing System software.

Prior to 6.0, updates were available for downloading from bulletin boards and through user groups. This is no longer the case in Australia due to licensing agreements. In the US, however,



software is still available for downloading from many bulletin boards and all the US national electronic services.

We went to our local dealer and bought the boxed copy that's reviewed here. We paid \$99 for it. We also tested the version that was sent to most developers several weeks before the actual release

and the System 6.0 files that are available electronically in the US. In most cases we observed no differences between them. Unless specifically noted, this review covers the boxed release.

## ***First the new***

Almost every file that the 5.0 package contained has been changed. The System is bigger, the Finder is much bigger, and there are lots of fixes throughout the package.

Version numbering is still as screwy as always. The System version number jumped from 4.2 to 6.0, whereas the Finder went from 6.0 to 6.1. Most of the smaller files incremented their version numbers by 0.1 (the Control Panel cdev went from version 3.2 to version 3.3). However, the Font/DA Mover, the LaserWriter driver file, the Laser Prep and some other files all jumped 0.2. This style of version numbering might be fine for internal use in a software company, but it's ridiculous for releases to the general public. Every file in this package should have the same

version number. More than ever, Apple needs a Version Number Czar to sort through the current chaos.

All the old files are there, and there are 11 entirely new files: a LaserWriter IISC driver, the Map program, the Close View program, MacroMaker (with a Help and a Macros file), Responder, and four In-



# POWER HOUSE.



The PC power you've been waiting for is here! The revolutionary SYSGEN PRO SYSTEM, from Guardian Data.

Pro System is built from the ground up, starting with a fast 12 MHz 80286 processor integrated into a compact system board with memory, CGA and super EGA graphics, hard disk and floppy controller, real time clock, SCSI, parallel and serial interfaces, all combined on a single motherboard which moves data 6 times faster than on comparable 286 machines.

But the key to Pro System's power is that it grows, with you.

The provision of four drive slots enables you to customise your system while the built in SCSI controller automatically supports a full selection of high performance peripherals including tape back-up systems, optical disks and laser printers — without occupying even one slot!

#### **SYSGEN Pro System.**

Brilliantly designed and manufactured in the USA, Pro System is a powerhouse PC-286.

So discover the power for yourself today.

Contact Guardian Data or complete this coupon for more information.

#### Standard configuration includes:

- 640K expandable to 2.6 MB
- 80286, 12 MHz
- 40 MB HDD — 18 MSEC
- 1 x 5 ¼ FDD, 1.2 MB/360K
- 1 x 3 ½ FDD, 1.44 MB/720K
- CGA, EGA Graphics
- SCSI Interface



SYSGEN products are distributed in Australia by Guardian Data.

SYDNEY: Unit 2, 72-74 Gibbes St.,  
CHATSWOOD NSW, 2067. Tel: (02) 406 6144.  
MELBOURNE: Level 1, 436-438 Elgar Rd.,  
BOX HILL VIC. 3128. Tel: (03) 896 1314.

Yes!

I'd like more information on the SYSGEN PRO SYSTEM.

Mr/Mrs/Ms \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

Postcode \_\_\_\_\_

Tel: \_\_\_\_\_

OR ATTACH YOUR BUSINESS CARD

G0305

## CHECKOUT

staller Scripts (one each for the Plus, SE, and II and one for AppleShare) that create minimal Systems for use when space is a big problem.

The LaserWriter IISC printer driver has been available since the printer was released. Its appearance here marks the first time it's been included in the System Software Updates. It's necessary only if you are using the LaserWriter IISC.

The Map program is a cdev, or Control Panel device. It works only with System 4.1 and later. To use it, you simply drag its icon into your System folder. Then you run Map by selecting its icon from the scrolling list that appears at the left side of your Control Panel DA.

Map is a world map. It comes with a preset list of cities (recorded by name, latitude and longitude). You can set your Current Location and then either click on a city and get the distance (in great circle kilometres) from your location, or type in a city's name, and it will flash its location (and tell you how far it is from the Current Location). You can discover the distance between any two cities fairly easily. If the list of cities and locations Map provides is inadequate, you can add more at will, providing you know their latitude and longitude. If that information is not available, you can do cruder positioning based on rough approximations of time zones.

Map will reset your Mac's internal clock if you change the Current Location. Therefore, you should make sure the Current Location is the actual location of the Mac.

The Current Location is permanently stored in parameter RAM (PRAM) along with the time. Applications such as travel-information programs and HyperCard can use this information directly, just as they can use the time settings. This, apparently, is the real reason for Map's existence.

CloseView is a utility that makes it easier for visually impaired users to read or view the screen. It offers magnifications from two to 16 times, and also lets users invert their screen displays (to white on black). It does not work in colour. If you print or dump a magnified screen, you get the actual-size images, not the expanded images. That's OK because that's usually what you really want.

You control CloseView either by using Command keys or by selecting it in the Control Panel. One of its few drawbacks is that if you have installed it, it automatically turns on when you start the Mac. This means that its heavy and somewhat obtrusive framing rectangle is visible. And there's no Command-key equivalent to shut it off; you have to go

## TOOLS FOR THINKING

### UI/2

The most advanced Code Generator on the market for C, Clipper, Cobol, dBASE 3+/4, dBaseXL, Fortran, Pascal, etc. UI/2 will build Menus, Forms, Reports, Programs, rather than you manually code.

Advanced NEW features:

- enhanced template language
- generate complete systems
- ability to compile templates
- extended object definitions - fields/variables: definable initial values, ranges
- extended object and design environment

**UPGRADE YOUR  
OLD UI TO UI/2!!!**

### XDB-SQL

The Top Rated SQL DBMS XDB provides a menu-driven set of tools for application development. Applications can be interfaced to C, Cobol, and Pascal and be embedded with SQL. XDB applications run with no change on PCs, LANs and UNIX

XDB comes in three modules:

- XDB-SQL Report Writer and tools (eg. Menu Generator)
- XDB-FORMS forms manager
- XDB-C, PASCAL, COBOL interface

### C-Scape / C-Worthy

C-Scape and C-Worthy are two powerful C Toolkit Libraries

#### C-SCAPE

- MSDOS, UNIX, XENIX, VMS
- Menus, Windows, Screens
- Context Sensitive Help
- Data validation of fields
- Function building toolkit
- Optional Mouse driver
- Source code available

#### C-WORTHY

- Turbo, Quick, Lattice, MS, OS/2
- Menus, Windows, Screens
- Forms for data validation
- DOS interface, source code
- Error handling

### PVCS

PVCS automates Configuration Management. Provides: Project Reporting, Management Control Access and Version Control by maintaining a history of revisions to a source document. The "source document" can be any file, (code, obj, lib, or project documentation) and is stored in a central Project database. Basic Features:

- Audit Trail Log - Who, When, Why, Which program changed
- Prevents unauthorised/conflicting changes
- MSDOS, LANs, UNIX, VAX, MP2

### db VISTA

db VISTA is an advanced database development system intended for use by C application developers.

db VISTA provides:

- Fast access to data
- Mainframe functionality
- Portability to any C environments
- Minimal data redundancy
- Multi/Single-user support
- Transaction logging & rollback
- Multiple database access
- Database dictionary
- Database definition language
- SQL-based Query/Report module
- Runs on VAX, UNIX, XENIX, OS/2, SunOS, MSDOS, Macintosh

### PRE/DB

PRE/DB is a preprocessor for improving speed and reducing runtime memory requirements. It is language independent. Seven directives are offered:

- Constants - #define ERROR 1
- Compiler Macros, eg. #define IS-LOWER (C) IFF (...)
- #undef It "undefines" the specified variable or macro
- #include <file> - specified file will be read and placed into current file
- #ifdef/#elseif/#endif and #ifndef for conditional compilation/interpretation

### OTHER SOFTWARE

- YOURDON Analyst/Design Toolkit
- ADCOMM advanced COMMS library for Clipper/dBASE dialects
- UNLOCK for copy-protected s/w
- dSALVAGE repair damaged DBF
- DOCUMENTOR/dANALYST/CLEAR for documenting dbase programs
- TOM RETTIC'S HELP pop-up help
- TOM RETTIC'S LIBRARY contains over 175 DDFs for Clipper, QS.
- dBX - dbase to C translator
- NETLIB for Clipper developers
- dBaseXL - dbase 3, New Version 1.2C
- dBaseXL/LAN Networking dBaseXL

**We have over 1000 products ready to serve your needs call NOW!!!**

### dGE

dGE provides high-resolution graphing functions. Compiled directly into your application or as a memory-resident kernel. A brief overview of dGE:

- Supports C, dBASE 3/4, dBaseXL, Clipper, Foxbase, QSilver
- Supports CGA, EGA, VGA, MGA
- IBM PC, XT, AT, PS/2, others
- Dot Matrix, Laser, Plotters
- OS - MSDOS, OS/2, MS Windows
- GRAPHS: Bar, High-low-close, Pie, Polar, Polyline, Time, Series, Cartesian, etc.
- Unlimited no. of overlays and mix of graph types

### AUTHORISED AUSTRALIAN DISTRIBUTOR

**For more details call MDMS (02) 745 1677, 745 1995 Fax: (02) 742 5030  
PO Box 734, Strathfield, NSW 2135**



## DATAGO DT-III



9" CRT high res. monitor supports mono and colour graphics. 84 key keyboard. Drives: Two 5.25" or 3.5" or: one floppy + one hard or two floppies + hardcard. 4 exp. slots. 440 [wide] x 173 [high] x 358 [long]. 11.8kg. Carry Bag optional.

### DATAGO DT-III AT

- 80286-10 processor 12 Mhz (16 Mhz 0. wait)
- 1MB memory on board • 1 x 1.2Mb floppy drive
- 1 x 40MB hard drive • Serial and parallel ports
- Clock and calendar • Colour or monochrome card • Up to 4 MB RAM on board • Support extended memory • Support expanded memory LIM/EMS RAM management
- Power good circuit on main board

**\$3690**

### DATAGO DT-III XT

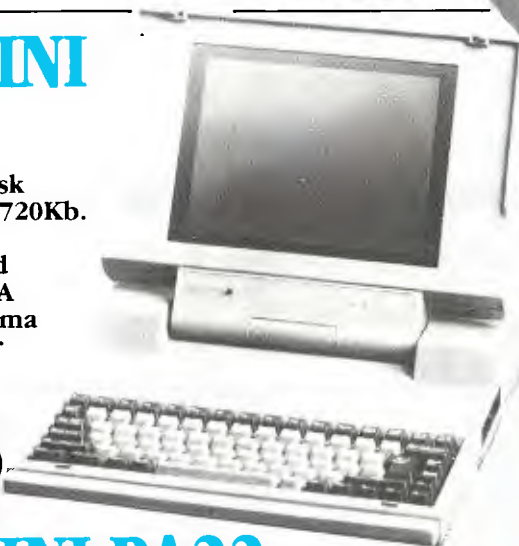
- 8088-1 processor 10 Mhz • 640K memory on board
- 1 x 360K floppy drive • 1 x 20MB hard drive
- Serial and parallel ports • Clock and calendar
- Colour or monochrome card.

**\$2485**

## DATAMINI PA40

1 x 3½" floppy disk drive — 1.44 Mb/720Kb. 40Mb hard disk. External RGB and keypad ports. EGA 640x400 Gas Plasma Display with four gray scales.

**\$4990**



## DATAMINI PA22

1 x 3½" floppy disk drive — 1.2 Mb/720Kb. 20Mb hard disk. External RGB and keypad ports. EGA 640x400 Gas Plasma Display with two gray scales.

**\$4490**

# WHEN YOU NEED DAVID RATHER THAN GOLIATH

## DATAMINI PA 20

Is laptop in size but state-of-the-art in PC power.

EGA 640 x 400 Gas plasma super clear display, 1 x 3.5"

720KB/1.2 MB floppy drive, 1 x 20 MB

Hard Disk, two serial and one printer ports. The PA 20 is a high-speed PC built for

sophisticated

applications like advanced

CAD/CAM as well as all available

programmes for AT/AT compatible. Its

main board holds an 80286 CPU,

640KB RAM, socket for an optional

80287 co-processor and 32K BIOS

ROM.

**\$3995**

ACD and Cartel have merged and moved to bigger, brighter and more modern premises. Please now note the new address under our logos.



**CARTEL  
PERSONAL  
COMPUTERS**



**Australian Computer Distributors**

146 Hawthorn Road, Caulfield, 3161.

Telephone: (03) 528 1988.

Facsimile: (03) 528 5360.

# If your computer dealer isn't talking about **AOC** monitors you'd better get him talking with us!



## 14" EGA

- Model # CM-312
- EGA/CGA Dual Mode
- Green/Amber/Colour switch
- High resolution
- Tilt & swivel base



## 14" Multisync

- Model # CM-314
- TTL/analog video
- Auto switchable scanning
- Tilt & swivel base

## 14" Flat Screen Mono

- Model # MM-411D
- Green or Amber
- Dual frequencies



## 14" VGA Colour Monitor

- Supports IBM PS/2 and the compatible
- Analog video input
- Vertical scanning frequency 50/60/70 Hz (auto switchable)
- Green/Amber/Unlimited colours switch selectable
- True ergonomics design with tilt/swivel base



## 12" VGA Monochrome Monitor

- Supports IBM PS/2 and the compatible
- Analog video input
- Vertical scanning frequency 50/60/70 Hz (auto-switchable)
- True ergonomics design with tilt/swivel base
- Non-glare, white phosphor screen

There's a new name in mass market monitors that's synonymous with quality. It's AOC. And if your computer dealer isn't talking AOC for your next monitor purchase, you'd better get him talking with us!

Employing 800+ people and turning over in excess of US\$100 million, AOC is doing something very right. The key to their success is ensuring that their monitors are of

high quality, competitively priced, and able to meet differing needs of computer users worldwide. From monochrome through to PS/2 compatible, CGA, EGA, VGA, and Multi-sync, AOC has the range.

Monitors aren't just monitors. Treat your PC to the quality of an AOC. It won't cost you any more, but you'll appreciate the difference

**COMPUTER  
DEVELOPMENTS**  
PTY LTD.

P.O. Box 177, Ashgrove, 4060  
70 Enoggera Road, Newmarket, 4051  
Ph: (07) 352 6022 Fax: (07) 356 6791

**DEALER ENQUIRIES WELCOME**





## CUSTOM COMPUTER SERVICES

### BRISBANE

Cnr Warren St, Fortitude Valley Ph: 832 2192  
744 Gympie Rd, Chermside Ph: 350 3344  
Shop 3/11 Kempster Rd, Mt Gravatt Ph: 343 5389

### GOLD COAST

Shop 3/115 Currumburra Rd, Ashmore Ph: 394 653

### SYDNEY - VIP ELECTRONICS

106 Buckingham St, Surry Hills Ph: 319 3207

### MELBOURNE

119 Station Street, Malvern Ph: 509 4433

### TOWNSVILLE

227B Charters Towers Rd, Hermit Park Ph: 751 777

## CCS OFFER EXCEPTIONAL VALUE FOR MONEY ON OUR NEW 80386 AND 80286 COMPUTERS

- CCS 25 MHz 0 WAIT 80386 COMPUTER
- INTEL 80386/20 MICROPROCESSOR
- SWITCHABLE 8/16/25 MHz 0 WAIT STATE
- SUPPORTS UP TO 8 MEGABYTES RAM ON SYSTEM BOARD
- TOTAL MEMORY EXPANDABLE TO 16 MEGABYTES
- OPTIONAL 80287 OR 80387 COPROCESSOR
- OPERATES IN PAGE MODE WITH INTERLEAVE SUBSYSTEM
- SHADOW RAM SUPPORTED
- FOUR 16 BIT I/O SLOTS THREE 8 BIT I/O SLOTS
- ONE 32 BIT MEMORY SLOT WITH 0 WAIT
- ONE 1.2 MEGABYTE AND ONE 360K FLOPPY DISK DRIVE
- 250 WATT POWER SUPPLY
- STD 84 KEY KEYBOARD (101 KEY KEYBOARD OPTIONAL)
- CGA OR MGA MONITOR ADAPTOR
- AMI 386 BIOS
- BATTERY MAINTAINED REAL TIME CLOCK
- OPTIONAL TOWER CASE
- CCS 12 MHz 0 WAIT "AT" COMPUTER
- INTEL 80286/12 MICROPROCESSOR
- SWITCHABLE 8/10/12 MHz 0 WAIT
- SUPPORTS UP TO 4 MEGABYTES RAM ON SYSTEM BOARD
- TOTAL MEMORY EXPANDABLE TO 16 MEGABYTES
- SUPPORTS EMS EXPANDED MEMORY SYSTEM
- TWO 8 BIT I/O SLOTS SIX 16 BIT I/O SLOTS
- ONE 1.2 MEGABYTE AND ONE 360K FLOPPY DISK DRIVE
- 180 WATT POWER SUPPLY
- SERIAL AND PARALLEL PORTS
- BATTERY MAINTAINED REAL TIME CLOCK
- STD 84 KEY KEYBOARD (101 KEY KEYBOARD OPTIONAL)
- PHOINEX AT BIOS
- CGA OR MGA MONITOR ADAPTOR
- JAPANESE MAINBOARD
- SMALL FOOTPRINT CASE
- OPTIONAL TOWER CASE
- CCS SUPER MOUSE with PC PAINTBRUSH
- ABLE-1 SOFTWARE PACKAGE

**CCS 80386 25Mhz COMPUTER**  
**PRICE WITH 2 MEGABYTES OF RAM**  
**\$4250.00 inc. tax**

**CCS 80286 "AT" COMPUTER**  
AVAILABLE IN TWO CONFIGURATIONS  
WITH 2 MB RAM \$2199.00 inc. tax  
WITH 4 MB RAM \$2799.00 inc. tax

**ADD ONLY \$60.00 FOR CCS MS DOS ver 4.0**  
**with**  
**DOS MANAGER AND GW BASIC**

**CCS TOP QUALITY 5.25" FLOPPY DISKS AT REALISTIC PRICES**  
**PRICE PER BOX OF 10 DS/SS 5.25" DISKETTES**

|                        |                           |                         |
|------------------------|---------------------------|-------------------------|
| <b>ONE BOX \$12.00</b> | <b>FIVE BOXES \$10.80</b> | <b>TEN BOXES \$9.60</b> |
| <b>25 BOXES \$9.00</b> | <b>50 BOXES \$8.40</b>    | <b>100 BOXES \$7.80</b> |



### FIVE REASONS TO BUY A "CCS" COMPUTER SYSTEM

1. We sell a good range of computers and peripherals at very competitive prices.
2. We have company owned stores from Townsville to Melbourne where service, including warranty service can be obtained.
3. We assemble our own computers and consequently we can design a system to suit our customers requirements.
4. As we sell our own products we can provide service on those products, and
5. Because of our service ability we offer customers purchasing our own products the option of a 12 month or 24 month warranty.



## MONITORS



## PRINTERS

### CCS XT COMPUTER

640K RAM, TWIN 360K FLOPPY DISK DRIVES, CGA AND MGA MONITOR ADAPTORS, PARALLEL AND SERIAL PORTS, GAMES PORT, REAL TIME CLOCK, STD KEYBOARD, 4.77/10 MHz M/BOARD, 180 WATT POWER SUPPLY.

#### PRICE INCLUDES

CCS MS DOS ver 4.0 with DOS MANAGER AND GW BASIC

CCS SUPER MOUSE WITH PAINTBRUSH SOFTWARE

CCS ABLE-1 INTEGRATED SOFTWARE PACKAGE

THIS SYSTEM IS REAL VALUE FOR MONEY AT OUR RETAIL PRICE

**\$1159.00** (inc tax)

### CCS MONITORS

#### CCS 12" MONOCHROME MONITOR

Large 12" high resolution monochrome display with high contrast, dark tint non-glare screen for sharper images, dust scanning frequencies, tilt swivel base, reverse video switching, 1000 x 900 resolution

**\$168.00**

#### CCS 14" CGA MONITOR

Hi-contrast non-glare screen, 0.39mm dot pitch, tilt swivel base, 640 x 200 resolution, display colour green/amber/16 colours.

**\$499.00**

#### CCS 14" EGA MONITOR

High resolution colour display with non-glare screen, 0.31mm dot pitch, dual scanning frequencies (CGA EGA), tilt swivel base, 720 x 350 resolution.

**\$699.00**

#### CCS 14" MULTI SCAN MONITOR

Scans between 15.5 and 35 KHz, TTL and Analog input, 800 x 600 resolution, 0.31mm Trip dot pitch, dark-bulb black background, optional swivel base.

**\$799.00**

### CUSTOM COMPUTER SERVICES

**HAS A FULL RANGE OF COMPUTERS AND PERIPHERALS**

**CALL THE CCS STORE NEAR YOU**

**FOR A COMPETITIVE PRICE ON YOUR COMPUTER REQUIREMENTS.**

Custom Computer Services has an eight year standing in the computer community and has eight Company owned retail outlets from Townsville to Melbourne with others planned to open in the near future. As we assemble, market and service our own products we can offer up to 24 months warranty on our own brand of computers and peripherals.

### CUSTOM COMPUTER SERVICES

#### BRISBANE

Cnr Warren St, Fortitude Valley

744 Gympie Rd, Chermside

Shop 3/11 Kempsie Rd, Mt Gravatt

Ph: 832 2192

Ph: 350 3344

Ph: 343 5389

#### GOLD COAST

Shop 3/115 Currumburra Rd, Ashmore Ph: 394 653

#### SYDNEY - VIP ELECTRONICS

106 Buckingham St, Surry Hills

Ph: 319 3207

#### MELBOURNE

119 Station Street, Malvern

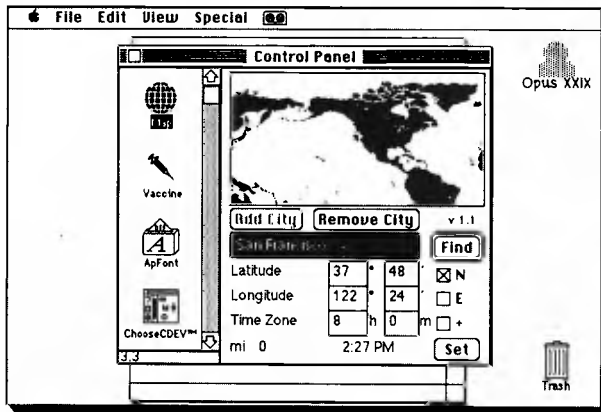
Ph: 509 4433

#### TOWNSVILLE

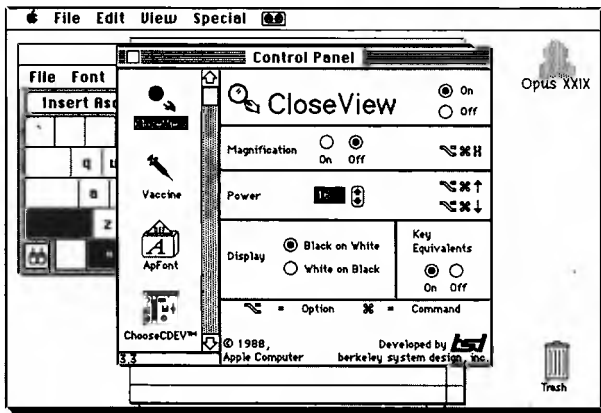
227B Charters Towers Rd, Hermit Park Ph: 751 777



# CHECKOUT



The Map display is also part of the Control Panel. The rapidly flashing point is the Current Location. You can determine distance or time difference either by clicking on the map or by entering a city name. If the name is in the preset database, the city's location will flash on the map. You can add or delete cities at will



If you select the CloseView icon in the scrolling list at the left side of the Control Panel, you get this display. This is where you can turn CloseView off (it's really the only way to hide the framing rectangle), decide on a white-on-black or a black-on-white (inverted) display, turn the magnification on and off and enable or disable key equivalents

to the Control Panel. This is a very minor flaw in a program that's going to help lots of people whose eye-sight isn't good. Still, I'd like the default to be off.

Apple paid a lot of attention to this program. The section of the Utilities User's Guide that documents it is printed in approximately 30-point type so that potential users will be able to read it. Even the reference in the table of contents is printed in large type. CloseView was created for Apple by Berkeley System Design, creator of Stepping Out and inLarge (the program on which CloseView is based).

MacroMaker is Apple's long-awaited macro application. Using it you can record characters and commands and play them back with a keystroke or two. Programs such as Affinity's Tempo II and CE Software's QuickKeys have long been among the most popular Mac utilities, and similar MS-DOS utilities are also best-sellers.

The metaphor chosen is the cassette recorder. The MacroMaker window looks like a tape recorder, and a special tape icon appears in your menu bar when MacroMaker is installed.

The program works pretty much as the icon and window suggest. You 'turn on' recording, perform some action, 'turn off'

## ISN'T IT TIME YOUR PC LEARNED SOME SIMPLE ARITHMETIC?

**\$49.00**  
INCL. SALES TAX



TallyUP is a PC software program designed to provide the facility of a constantly available on-screen arithmetic calculator.

**TallyUP Features:**

- Lotus! style interface
- Non-copy protected • Simple operation
- Unprecedented convenience • RAM-resident
- HP\* type or conventional operation characteristics • Constant arithmetic • 10 memories
- Constant memory • Paper tape • Prints calculations to printer or to screen • Imports and exports numbers. Without TallyUP an operator must constantly switch from PC to calculator during programs that require

calculations. The loss of concentration and time will be amply refunded after a few hours of using TallyUP. Stocks are available today at \$49.00 from ZIMWIL, your affordable high quality software distributor. \*HP is a registered trademark of the Hewlett-Packard Corporation. \*Lotus is a registered trademark of the Lotus Development Corporation.

**THE SOFTWARE LAB**

**TallyUP IS CALCULATED TO EDUCATE YOUR PC**

|                  |                              |        |
|------------------|------------------------------|--------|
| XT TURBO 20M H/D | \$1500, 40M H/D              | \$1600 |
| AT 1 MEG 20M H/D | \$2300, 40M H/D              | \$2400 |
| AT 386 1.2M F/D  | \$5070 (HARD DRIVE OPTIONAL) |        |

**ALL PRICES INCLUDE KEYBOARD  
DISPLAY CARD, FLOPPY DRIVE,  
PARALLEL SERIAL PORT, CLOCK,  
12 MONTHS WARRANTY.**

**MINISCRIBE HARD DISK DRIVES:**  
20MB \$400, 42MB \$500, 70MB \$1000.

**MATH CO PROCESSORS:**  
8087-2 \$260, 80287-6 \$300,  
0287-8 \$425, 80287-10 \$510

**CALL FOR THE BEST PRICES ON MONITORS,  
PRINTERS,  
ADD ON CARDS, FLOPPY DRIVES,  
WESTERN DIGITAL CONTROLLERS, AND FOR  
THE BEST PRICES ON ALL RANGE OF MEMORY CHIPS.**

**ALL PRICES INCLUDE SALES TAX,  
DEALER ENQUIRIES WELCOME.**

**MICROTEK**

220B NORTH ROCKS ROAD, NORTH ROCKS NSW 2151.  
TELEPHONE NO. (02) 630 5425

Please send me more information on TallyUP. ☐ Please send TallyUP software package(s) at \$49.00 each

MY NAME/TITLE IS \_\_\_\_\_ COMPANY NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_ TELEPHONE NO. \_\_\_\_\_

Please return this coupon to Bill Williams, Zimwil Pty Ltd, PO Box 559, Neutral Bay Junction, NSW 2089, (02) 955 8935, (02) 955 7298.

Method of Payment: ☐ Cheque ☐ Cash ☐ Postal Order ☐ Credit Card: Visa/Mastercard/Biners/Amex

Credit Card Number: \_\_\_\_\_ Expiry Date: \_\_\_\_\_ \*Cheques and Postal Orders should be made payable to Zimwil Pty. Ltd.

Sender's Signature \_\_\_\_\_ Dealer enquiries welcome.

1st FLOOR  
64 ENMORE RD.,  
NEWTOWN

# D.M. SOFTWARE

PH. (02) 517 2667  
(02) 519 4047

**SHAREWARE**

The programs listed below  
are a small selection from our extensive  
library of MSDOS. Free catalogues for Mac, Apple,  
Com 64 are available as is our complete MSDOS catalog.  
PHONE (02) 517 2667

**PUBLIC DOMAIN**

## LOTS OF NEW RELEASES — AT THE BEST PRICE IN TOWN

### UTILITIES

- MU005 : ESSENTIAL UTILITIES. NEW RELEASE.** Incl. Cover Com, Browse, CRC67, Timepark, Screensave and more.  
**MU007 : HARD DISK TEST UTILITY.** Extensive testing routines for your hard disk. Catch errors before they catch you.  
**MU013 : SIDEKICK ASSISTANT.** Pal V1.4 Sidekick enhancement. Incl. PALSET.  
**MU016 : MMU. MEMORY MANAGEMENT.** Set of programs to check, expand and manage memory.  
**MU019 : PROFESSIONAL MASTER KEY.** PHK V 2.1. Excellent program that includes unformat hard disks, deletes and undeletes files.  
**MU022 : DISK MASTER.** ADVANCED DOS and FILE MANAGEMENT. HIGHLY RECOMMENDED.  
**MU024 FAST COPY UTILITIES. NEW RELEASE.** Includes freecopy, fastcopy.  
**MW006 : PRINT CONTROLLER.**  
**MW008 : MULTI PRINT CONTROLLER.**

### FINANCE & BUSINESS

- MF005 : 123 COMPATIBLE S/SHEETS. NEW RELEASE.** Aseasyas Ver 3.00D  
**MF015 : PC-CALC. 3 DISKS. \$30.** Great financial programs and graphics.  
**MF016 : CO-ORDINATE GEOMETRY. 2 DISKS. \$22.** A must for engineers. Includes COGO version 1.21.  
**MF018 : TURBO LEDGER.** Excellent general ledger - reports on P&L, aged debtors analysis and more.  
**MF025 : SERVICE INDUSTRY BILLING. 2 DISKS. \$22.** Soar Version 2.01. Prints invoices, mailing lists, debtors - excellent reporting.

### WORD PROCESSING

- MW001 : GALAXY.** Ver. 2.3, is Wordstar compatible. Is our top selling word processor. User friendly.  
**MW004 : JUNIOR WORD PROCESSOR.** Is especially for kids. Has large lettering and uses only a few keys.

### GENERAL / SPECIAL INTEREST

- MM004 : LIGHT PLANE NAVIGATIONAL AIDS.** Includes pre-flight planning, costing, checkpoint info and more.  
**MM008 : HAM RADIO.** Req basic design UHF and VHF Yagi beams, incl. HAMCALC, BESTBEAM, MAGNIFY, TTY22, LOWPASS and much more.  
**MM010 : HAM RADIO.** Incl. HANNET PACKET RADIO and tutorial, REQ BASIC.

### LANGUAGES

- ML022 : XLISP. VER.1.7.** Written in C, for the artificial intelligence programmer.  
**ML023 : BASIC WINDOWING TOOLBOX. NEW RELEASE.** Incl. (B-Window) routines for Basic programmes V2.0  
**ML024 : C WINDOWING TOOLBOX. NEW RELEASE.** Incl. (C-Window) routines for 'C' programmers.  
**ML025 : TURBO ENHANCEMENT TOOLBOX. NEW RELEASE. V3.0.** Routines for Turbo Pascal 4 that access the video display, keyboard, printer, disk & mouse devices.

### GAMES

- ME161 : FLIGHT SIMULATOR.** REQ. BASIC. 4 TOP PROGRAMS INCL. JET PILOT, SOPWITH, JETSET, AFS-ED, BEST SELLER.  
**ME002 : TENNIS & BILLIARDS.** Req. cga/ega. Can you take a set off the computer? Play billiards and pool? Great graphics.  
**ME134 : BIBLE QUIZ.** This will test how well you know your bible.  
**ME135 : BIBLICAL CHARACTERS QUIZ.** You will be given some clues to help identify the person but you will need them. Excellent program.  
**ME174 : TEXT ADVENTURE PLUS. NEW RELEASE.** Has 3 great games — Terror Temple of Ad Mir & Haunt.  
**ME172 : GRAPHICS PLUS. NEW RELEASE.** Req. cga/ega. Has bomber — you are the pilot on a bombing mission. Great graphics.  
**ME174 : THE GREAT PAPER PLANE KIT. NEW RELEASE.** Construct your own paper plane. From B52's to jet fighters. Great fun.  
**ME170 : EGA SPECIAL.** The wheel of fortune. Try your luck.  
**ME165 : KIDS EDUCATIONAL GAMES.** Req. Basic. CGA/EGA. Have fun while learning Maths & testing your memory. Top seller.

### COMMUNICATION

- MC016 : GT POWERCOMM. 3 DISKS.. \$30.** New Release Ver.3.

### GRAPHICS

- MG021 : OPTIKS. NEW RELEASE.** Great new program which reads/ writes & prints most graphic files/format incl. Mac, Fantasy, Newsroom & more.  
**MG009 : FORM LAYOUT. EZFORM.** Design your own invoices, l/heads, forms.  
**MG013 : GRAPHICAL REPORT ANALYSIS. 2 DISKS. \$22.** Kwikstat. req. cga/ega. Excellent reporting, does stats analyses, line & pie charts.  
**MG011 : AUTOCAD TOOLS.** Will give you plot quality output on dot matrix printers.  
**MG022 : PC-KEY DRAW V3.33. NEW RELEASE. 2 DISKS. \$22.** Powerful drawing capabilities plus Cad features as well.

### DATABASE

- MD001 : FILE EXPRESS. NEW RELEASE. V4.11. 2 DISKS. \$22.** Excellent data base, no programming required.  
**MD002 : PC-FILE PLUS. 3 DISKS. \$30. V2.0.** Popular database management incl. sales, stock and more.  
**MD009 : RELATIONAL DATABASE. V1.0A. PC-DBMS.** Well documented.  
**MD017 : FAMILY TREE GENEEOLOGY.** Incl. Family Ties V.1.15. User friendly database for your own personal family tree.  
**MD020 : FILEMASTER. NEW RELEASE.** Control your "paper-chase" by maintaining files with a numeric index.

Unless otherwise stated all disks are \$15.00  
(incl. Sales Tax).  
Add \$3.00 for all 3 1/2" disks.  
Add \$3.00 for postage & packing

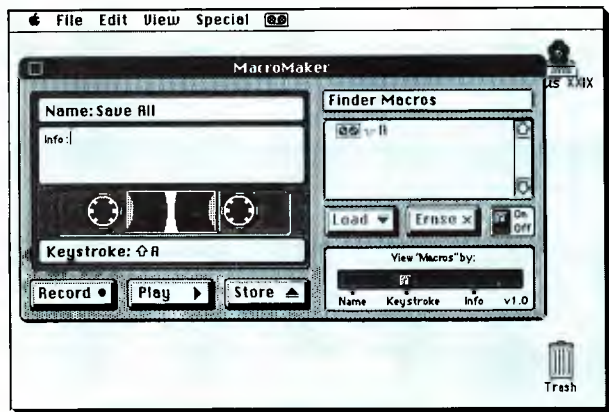
**ANY ORDER OF \$65 OR  
MORE QUALIFIES FOR 2  
FREE DISKS OF YOUR  
CHOICE**

**THE CHANCERY CLUB**  
Join the Chancery Club and be eligible  
for 10% discount on all future orders for  
the next 12 months. **PLUS** free postage &  
packing. If you would like to join, the  
membership fee is \$25 per year

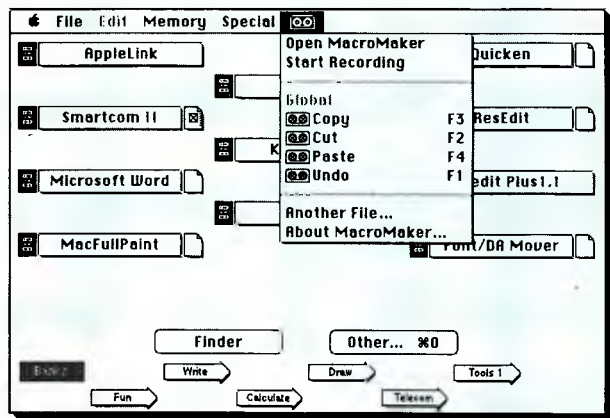
**ORDERS TO BE SENT TO :**  
**D.M. SOFTWARE**  
**PO BOX 103**  
**ENMORE. NSW 2042.**  
**FAX: (02) 517 2667**



## CHECKOUT



This is MacroMaker's main screen. You get to it by selecting the top item on the MacroMaker menu. After your macro has been recorded, you name it and assign comments and key equivalents. The scrolling list at the top right shows all the macros in the current list. The slider at the bottom right sorts that list



Whenever MacroMaker is active, the tape icon appears to the right of the other menus in the menu bar. Pull it down to gain access to the MacroMaker window and any currently active macros. If you have global macros, they're listed under the application-specific macros. Macros are displayed with key equivalents

recording, and assign a name and key equivalents. That's it. It sounds simple, and it is. But that's also a lot to go through simply to make, say, a DA callable by a Command keystroke.

You can create as many macro sets as you want and switch freely among them. You also have the choice of creating application-specific macros or global macros that are always available. This part of the program is very strong.

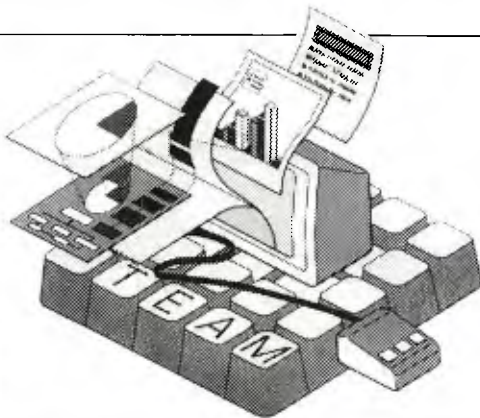
The whole program is slightly too cute and not quite powerful enough. There are things you can't do that are fairly easy to do with either Tempo II or QuickKeys. For example, MacroMaker records only certain mouse actions, so it's unlikely that you could use it to handle dialogue boxes or alerts. And the Specials and Date/Time features of QuickKeys are simply not available. It looks as though Apple tried to combine the best of Tempo and QuickKeys; it still has a way to go to beat either, however.

We had some problems with MacroMaker, particularly when trying to open new macro files. It consistently froze the Mac. Although MacroMaker has some potential, its main virtue right now is that it's free. It's neither anywhere near as powerful as Tempo II nor as versatile as QuickKeys. Because it is free, you should

# ...a total graphics solution for the serious presentation user...

☐ DRAWING  
☐ GRAPHICS  
☐ WORD  
☐ CHARTING

all included in  
one powerful  
presentation  
package for a value  
packed price of  
**\$750**  
(excluding tax)



# GEM

*Presentation Team*

Another great product from:



**DIGITAL RESEARCH**

# YES!..

... I would like to know more about the "GEM Presentation Team".

PLEASE SEND DETAILS:

NAME: .....

ADDRESS: .....

..... P/CODE.....

PHONE .....



RETURN TO:  
**QUERCUS  
DISTRIBUTORS**

159 BURBRIDGE ROAD  
HILTON, S.A. 5033  
PHONE (08) 234 1411  
FAX (08) 234 1311

# ...We're in the business of Business Computers



## HARDWARE

### \* HIGH PERFORMANCE SYSTEMS - GREAT VALUE

Epson PC/AX2, 20Mb, mono  
Epson PCe, 20Mb, mono, 10MHz  
NEC Powermate 286 or 386  
Mitac - the most reputable clone - 8088,  
80286 and 80386 systems

### \* MONITORS

NEC Multisync 2  
TVM MD300 CGA

### \* FILE STORAGE

We have a full range of floppy and hard disks at competitive prices including Miniscribe, Seagate and Hardcard. Call NOW for a quote on your requirements.

### \* ADD-ON BOARDS

Again, a full range including Intel, Hypertech, AST and Everex. Call NOW for your quote.

\* ALL PRICES INCLUDE FULL TECHNICAL SUPPORT

## SOFTWARE

### SPREADSHEETS

Lotus 1-2-3  
Quattro  
MS Excel

### WORDPROCESSING

MS Word  
WordPerfect (4.2)  
Multimate II  
WordStar Professional

### DATABASE

dBASE III Plus  
Paradox 2.0  
Dataflex

### PROJECT MANAGEMENT

### COMMUNICATIONS

### ACCOUNTING

### PUBLISHING

PageMaker  
Ventura

### GRAPHICS

Harvard Graphics  
MS Chart

### INTEGRATED

Framework  
Symphony  
First Choice

### UTILITIES

CALL FOR MORE THAN 500 TITLES NOT LISTED.  
Add 14% for tax inclusive price.

Ex tax  
2671  
2407  
Call

Call

1079

570

Call

Call

Ex tax  
521  
246  
631

499

548

592

434

736

841

1118

Call

Call

Call

Call

Call

516

379

832

802

187

Call

## TOP VALUE FOR THE AUSTRALIAN TOP TEN

1. Lotus 1-2-3  
2. DisplayWrite IV  
3. WordPerfect  
4. Microsoft Word  
5. dBASE III Plus

RRP  
ex tax  
855  
965  
775  
795  
1300

Our price  
ex tax  
521  
789  
548  
499  
736

6. Multimate II  
7. WordStar V 4.0  
8. Microsoft Multiplan  
9. Microsoft Excel  
10. Dataflex

RRP  
ex tax  
970  
590  
345  
875  
1340

Our price  
ex tax  
592  
435  
Call  
Call  
841

## Lotus

Ex tax

Lotus 1-2-3  
Lotus Hai  
Lotus Metro  
Lotus Freelance Plus  
Lotus GraphWriter  
Lotus Manuscript

521  
223  
139  
688  
688  
688

## Microsoft

Ex tax

MS Word  
MS Excel  
MS Quickbasic  
MS Quick C  
MS Mouse  
MS Works

499  
631  
104  
104  
199  
262

### SUPERTRADER BENEFITS WITH EVERY PURCHASE

3 months' FREE Hotline support with EVERY product. All products sourced from official Australian distributor and carry the manufacturers' warranty as well as our own guarantee. 12 months FREE 4P membership (normally \$100) with a single purchase over \$1000. Delivery and insurance for only \$9.50 anywhere in Australia.



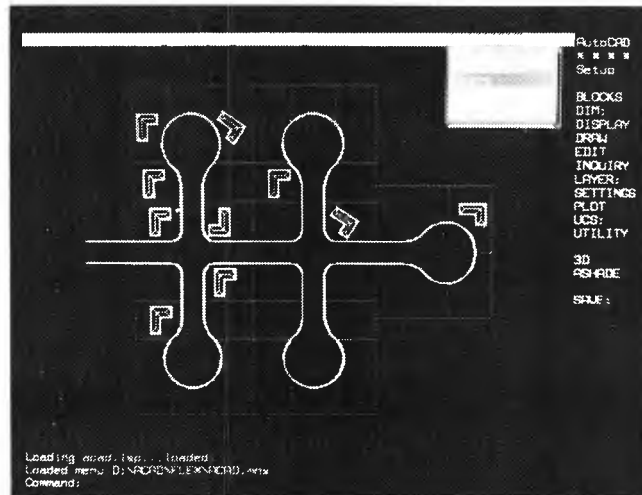
# The Computer Trader

Bankcard, Visa and Mastercard accepted. All stock subject to availability. Add 14% for tax inclusive prices.  
98 Hoddle Street, ABBOTSFORD (03) 417 7044  
261 Broadway, SYDNEY (02) 552 1755  
OPEN SATURDAY MORNING  
0605/RBusiness

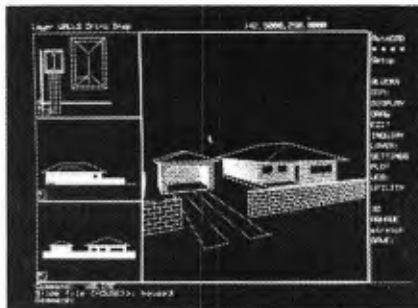


# FOR INFORMATION ON ANY HOUSE, ENQUIRE WITHIN.

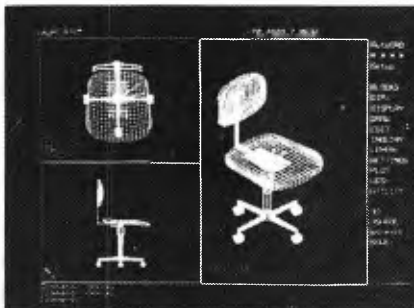
NEW AUTOCAD RELEASE 10, NOW SHIPPING.



*Easy to learn, compatible with most popular databases.*



*Multiple view ports for checking details.*



*True 3D drawing.*



*Data linked directly to graphic elements.*

Select any house on the plan of this housing estate and up comes the owner's name, address, year of construction and a list of all the connected services.

AutoCAD Release 10, the world's largest selling computer aided design package, links graphic elements with data stored in external database programs.

Other graphic elements show all the services connected to the house, such as water, power, telephone and

sewerage. If you need to know the details of these services, they can also be held in a database for instant access.

The package allows you to draw and model in 3D as easily as 2D drawing. Any structure or part you have drawn can be viewed, inspected from any angle or perspective.

Multiple view ports allow you to window in on areas of high magnification so you can check, from any viewing angle, every detail of your drawing as you go.

AutoCAD Release 10 is the result of years of probing user preferences for fast, easy to learn design tools and is compatible with most popular databases.

For further information or an obligation-free demonstration, call Autodesk Australia toll-free on 008 331 453, or in



Melbourne  
696 4455.

**AUTODESK**  
AUSTRALIA PTY LTD

9 Clifton Street, Richmond 3121 ADW1

...there's so much  
to talk about in such  
a little space

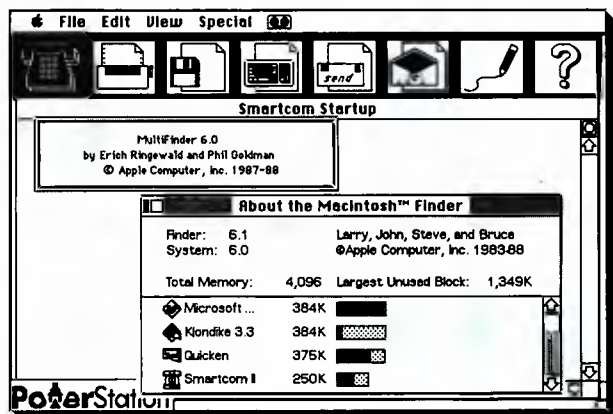


...talk to a dealer today.

**PC230** *by*  
 **MICRO BYTE®**  
Building computers for Australia

Phone 008-888533





*MultiFinder version 6.0 is a much improved program. It uses memory far more efficiently and is much better behaved than is version 1.0, which it replaces*

try it. Be sure you've saved your work before you give it a spin. If you like what it does, try Tempo II and QuickKeys. They do it better.

Responder is a tiny program that registers your user name on AppleTalk networks when you start up and prevents anyone else from using the same user name. While in test distribution, this program was known as Snitch. That pretty well describes it, and it had better because Responder appears to be totally undocumented (at least as far as users are concerned).

The System Software Update documentation is entirely new. Instead of

a pair of pamphlets that mentioned everything that was obvious and little that wasn't, there's now a pair of books. The larger is the 274-page Macintosh System Software User's Guide. This book is obviously intended to replace much of the machine-specific documentation that Apple has distributed up until now. It covers Macintosh operation from first operation up through moderately advanced user operation.

The System Software User's Guide is well written and good on what it covers. What it doesn't cover are the myriad shortcuts, tricks, and tips that allow you to most fully utilise the Mac. Indeed,

some techniques and tips (such as clicking on the disk icon in dialogue boxes to move up a level in the hierarchy) that were present in earlier Apple System documentation are not to be found here. What's worse, there is no mention that users can go beyond the operating techniques outlined, nor is any information provided on where to find such information. (And I know I'm sort of preaching to the converted here.)

The smaller Macintosh Utilities User's Guide is no lightweight at 171 pages. It's also more important because it explains how to use Map, CloseView and MacroMaker. Map and MacroMaker, for all their external simplicity, are not particularly intuitive, and the manual recognises this. For example, it devotes eight pages to the very important Font/DA Mover (and omits the tip mentioned later that can eliminate many of your Font/DA Mover problems) and gives 10 pages to Map, which at this time is essentially a curiosity.

Both volumes have some typos (for example, referring to Utilities Disk 1 when the file is on Utilities Disk 2), but none are serious. It's just that I expect none from Apple. There is, however, a chart in Appendix A that I strongly object to. It should not be there in the form it is. The

# WHEN YOU'RE INTO COMPUTERS

## POSITION PRESTIGE AND PROFESSIONALISM REALLY COUNT . . .

In Australia or Asia - this is THE way to do business!

- Mid City locations • Spectacular views • Telephone answered the way you want it • State of the Art PABX System • Fully furnished office • Complete secretarial • Word Processing • Facsimile • Telex • Intercom • Boardrooms & Bars • Photocopiers • Computers • Juniors to run messages • Short or long term leases. When you lease one Servcorp City you immediately gain access to all!

**SYDNEY:** MLC Centre (02) 238 2100

**MELBOURNE:** Rialto (03) 615 0000

Brisbane (07) 232 0300, Parramatta (02) 891 0000

Perth (09) 220 3400, Singapore 65-225 5535,

Wollongong (042) 24 5454, Canberra (062) 43 5151



# AMSTRAD

## FOR THE PRICE YOU GET THE WORKS

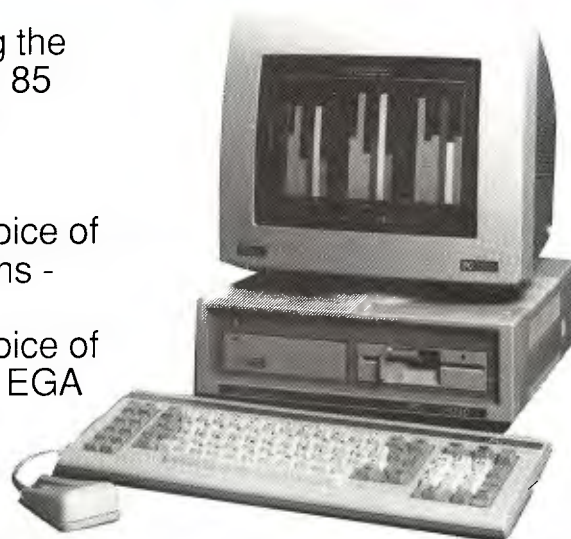
### Amstrad 1512 and 1640

A range of fast IBM Compatible machines using the 8086 processor at 8MHz. All machines have an 85 key keyboard, mouse and come complete with MS-DOS, GEM Desktop and Paint.

The 1512 has 512K RAM and comes with a choice of single or dual drive, mono or CGA colour screens - Hard disks and ram upgrades available.

The 1640 has 640K RAM and comes with a choice of single, dual or hard drive, mono, CGA colour or EGA colour.

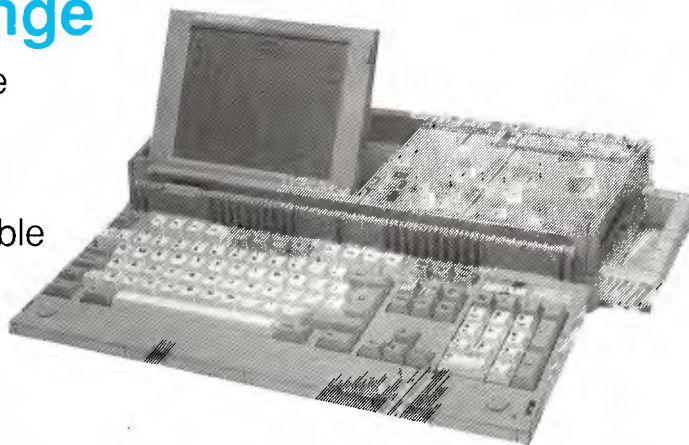
**from \$1099**



### The Amstrad PPC range

Portable power at affordable prices. The PPC512 and PPC640 are available with either single or dual 720K disk drives.

The PPC640 has a built-in modem capable of 300/300, 1200/1200, 2400/2400 and 1200/75 with communications software.



**HARD DISK + FLOPPY DRIVE OPTIONS AVAILABLE**

## \$500 value BONUS

With every AMSTRAD PC1512 you receive at no extra charge: ABILITY integrated software, PC-starter, three hours free training as well as four games.

**12 MONTHS WARRANTY  
ON ALL GOODS**

**ORDER BY MAIL OR PHONE.**

**OFFER VALID WHILE  
STOCKS LAST.**

## RamPage

Computers  
**THE AMSTRAD PEOPLE**  
Shop 13, 300 Toorak Road,  
South Yarra, 3141  
PHONE: (03) 241 3031  
FAX: (03) 240 0156

Please send me more information on:

AMSTRAD PC1640 ☐ AMSTRAD PC1512 ☐  
AMSTRAD PPC512 ☐ AMSTRAD PPC640 ☐  
AMSTRAD PRINTERS ☐

Name: .....

Address: .....

.....P/Code: .....



## What's in the box

| File/Folder Name           | Version     | Description                           |
|----------------------------|-------------|---------------------------------------|
| <b>System Tools</b>        | <b>72k</b>  |                                       |
| System Folder              | —           | Folder                                |
| Backgrounder               | 1.1         | System document (print spooler)       |
| Clipboard File             | 4.2         | System file                           |
| Colour                     | 3.3         | Control Panel cdev file               |
| DA Handler                 | 1.1         | MultiFinder file                      |
| Easy Access                | 1.0         | INIT file                             |
| Finder                     | 6.1         | Finder                                |
| General                    | 3.3         | Control Panel cdev file               |
| Key Layout                 | 2.2         | Keycaps DA file                       |
| Keyboard                   | 3.3         | Control Panel cdev file               |
| Monitors                   | 3.3         | Control Panel cdev file (Mac II only) |
| Mouse                      | 3.3         | Control Panel cdev file               |
| MultiFinder                | 6.0         | MultiFinder                           |
| Scrapbook File             | 2.3         | System file                           |
| Sound                      | 3.3         | Control Panel cdev file               |
| Startup Device             | 3.3         | Control Panel cdev file               |
| System                     | 6.0         | System                                |
| TeachText                  | 1.2         | Application                           |
| Read Me                    | —           | TeachText document                    |
| Setup Folder               | —           | Folder                                |
| Apple HD SC Setup          | 2.0         | Application                           |
| Installer                  | 2.6         | Application                           |
| Installer Scripts          | —           | Folder                                |
| Macintosh II Script        | 6.0         | Installer document                    |
| Macintosh Plus Script      | 6.0         | Installer document                    |
| Macintosh SE Script        | 6.0         | Installer document                    |
| <b>Utilities, Disk 1</b>   | <b>767k</b> |                                       |
| Installer                  | 2.6         | Application                           |
| Special Installer Scripts  | —           | Folder                                |
| Minimum Mac II Script      | 6.0         | Installer document                    |
| Minimum Mac Plus Script    | 6.0         | Installer document                    |
| Minimum Mac SE Script      | 6.0         | Installer document                    |
| AppleShare Script          | 1.1         | Installer document                    |
| System Folder              | —           | Folder                                |
| Access Privileges          | —           | AppleShare DA                         |
| AppleShare                 | 1.1         | INIT file                             |
| Clipboard File             | 4.2         | System file                           |
| Colour                     | 3.3         | Control Panel cdev file               |
| Easy Access                | 1.0         | INIT file                             |
| Finder                     | 6.0         | Finder                                |
| General                    | 3.3         | Control Panel cdev file               |
| Key Layout                 | 2.2         | Keycaps DA file                       |
| Keyboard                   | 3.3         | Control Panel cdev file               |
| Monitors                   | 3.3         | Control Panel cdev file (Mac II only) |
| Mouse                      | 3.3         | Control Panel cdev file               |
| Scrapbook File             | 2.3         | System file                           |
| Sound                      | 3.3         | Control Panel cdev file               |
| Startup Device             | 3.3         | Control Panel cdev file               |
| Apple HD SC Setup          | 2.0         | Application                           |
| Disk First Aid             | 1.4         | Application                           |
| HD Backup                  | 1.1         | Application                           |
| Responder                  | 1.0         | AppleTalk file                        |
| <b>Utilities, Disk 2</b>   | <b>708k</b> |                                       |
| Apple File Exchange Folder | —           | Folder                                |
| Apple File Exchange        | 1.1         | Application                           |
| DCA-RFT/MacWrite           | —           | Apple File Exchange document          |
| Font/DA Mover Folder       | —           | Folder                                |
| Desk Accessories           | —           | Font/DA Mover document                |
| Fonts                      | —           | Font/DA Mover document                |
| Font/DA Mover              | 3.8         | Application                           |
| MacroMaker Folder          | —           | Folder                                |
| MacroMaker                 | 1.0         | INIT file                             |
| MacroMaker Help            | 1.0         | MacroMaker document                   |
| Macros                     | —           | MacroMaker document                   |
| CloseView                  | 1.0         | Control Panel cdev file               |
| Map                        | 1.1         | Control Panel cdev file               |
| <b>Printing Tools</b>      | <b>274k</b> |                                       |
| LaserWriter                | 5.2         | Printer driver                        |
| Laser Prep                 | 5.2         | LaserWriter prolog document           |
| ImageWriter                | 2.7         | Printer driver                        |
| AppleTalk ImageWriter      | 2.7         | Printer Driver                        |
| PrintMonitor               | 1.2         | Application                           |
| LaserWriter IISC           | 1.0         | Printer driver                        |

chart is Fig A-1 on page 248 of the System Software User's Guide. It indicates that although it's not the best choice, the horribly dangerous System 3.0 can still be used on Mac 512Ks, 512KEs and Pluses. This System randomly destroys files and should never be used by anyone, anywhere. You have to wonder about the 'stick my head in the sand' viewpoint Apple is displaying with this chart.

### Then the old

System Software Update 5.0 brought MultiFinder, the modular Control Panel, and Installer. For a good overview of these files and the rest of System Software Update 5.0, see Robert Wiggins' article 'All systems go' in *APC*, March 1988.

The original version of MultiFinder had problems working with many applications. The problems weren't always its fault, but all the same, they caused a lot of grief. Lots of programs were revised to be more MultiFinder friendly. Some were so far off the standard that they never made it to MultiFinder friendliness.

And MultiFinder, although it worked, wasn't so friendly itself. The new version is much improved. It handles memory problems more smoothly and is more pleasant to work with. All programs that work with version 1.0 work with version 6.0. MultiFinder is now able to reclaim unused system heap space and will let you double-click on a document icon to open a document that belongs to an application that is already open.

Overall, the new MultiFinder will attract new users and make multi-tasking on the Mac a little more real.

MultiFinder, by its nature, operates best on a multimeg Mac. That hasn't changed, nor will it. The standard partition sizes for version 1.0 work fine in version 6.0. Desk accessories, however, are handled more cleanly; it's harder to run out of memory while using them.

As noted earlier, the System and Finder files are much bigger than they used to be, which is a problem for people without hard-disk drives. To help them, Apple has created a set of special Installer Scripts that create absolute minimal Systems for each of the supported machines. These minimal Systems are stripped of all possible resources and assume that you will not be using a LaserWriter (some of the LaserWriter font resources are omitted).

As always, Apple recommends that you turn MultiFinder off (no, there's no easy way to do that yet) before running either HD Backup or Font/DA Mover.

Font/DA Mover is somewhat improved,

# MICRO-PRO COMPUTERS

43 ATHERTON ROAD, OAKLEIGH 3166.

03 — 568 6911  
03 — 569 5450  
FAX  
03 — 568 2229



PERICOM

2 MEG MEMORY — 16-20 MHZ  
1 x 1.2 MEG TEAC DISK DRIVES  
SERIAL — PARALLEL I/O PORTS  
REAL TIME CLOCK WITH BATTERY  
MONO GRAPHICS TTL VIDEO CARD  
220 WATT POWER SUPPLY 240 V  
101 KEY KEYBOARD ENHANCED  
OPTION 80287-80387 PROCESSOR  
TOWER CASE

**\$5280**

640K MEMORY — 6-8-10-12 MHZ  
1 x 1.2 MEG TEAC DISK DRIVES  
SERIAL — PARALLEL I/O PORTS  
REAL TIME CLOCK WITH BATTERY  
COLOUR OR MONO VIDEO CARD  
200 WATT POWER SUPPLY 240 V  
101 KEY KEYBOARD ENHANCED.

PERICOM

**\$1800**



640K MEMORY - TURBO 4 - 8MHZ  
1 x 360K TEAC DISK DRIVES  
SERIAL — PARALLEL I/O PORTS  
REAL TIME CLOCK WITH BATTERY  
COLOUR OR MONO VIDEO CARD  
150 WATT POWER SUPPLY 240V  
84 KEY KEYBOARD PC/AT STYLE

PERICOM

**\$1025**



LAPTOP

640K MEMORY — 8-12 MHZ  
1 x 1.44 MEG YE DATA 3.5"  
SERIAL — PARALLEL I/O PORTS  
REAL TIME CLOCK WITH BATTERY  
MONO & COLOUR RGB VIDEO PORT  
82 KEY KEYBOARD  
PLASMA GAS SCREEN 80 x 25

**\$4230**

\*\*\* ALL PRICES INCLUDE SALES TAX \*\*\*

MONITORS  
COLOUR



MONITORS R.G.B.  
T.V.M. MD300 R.G.B. **\$550**  
MONITORS E.G.A.  
T.V.M. MD700 EGA **\$ 850**  
T.V.M. MD700/  
AUTOSENCE CARD **\$1095**  
SAMPO E.G.A. **\$ 795**  
SAMPO E.G.A. /  
AUTOSENCE CARD **\$1050**  
MONITORS V.G.A.  
SAMPO V.G.A. **\$1050**  
SAMPO V.G.A. /V.G.A  
AUTO CARD **\$1550**

MEMORY  
CARD



**\$325**

Extended or expanded  
to suit XT or AT computers.

JOY STICK



Self-centering, trim pots.  
fully IBM compatible. **\$30**

MONITORS MONOCHROME

SAMSUNG COMP **\$180**  
SAMSUNG TTL **\$185**  
PERICOM DUAL  
MONITOR **\$195**  
PERICOM TTL AMBER **\$175**  
PERICOM TTL GREEN **\$175**  
PERICOM TTL WHITE **\$185**  
PERICOM TTL  
14" GREEN **\$210**  
PERICOM TTL  
14" WHITE **\$220**

MONITOR



EPROM  
BURNER



Able to burn up to 512K Eprom,  
complete with software and manuals.

**\$220 (from)**

HARD  
DRIVES



**\$515**

SEAGATE 225 / WDC CONTROLLER  
TANDON 262 / WDC CONTROLLER

DISKETTES

**\$10 \$10**



PRINTERS



NATIONAL PANASONIC **\$369**  
EPSON LX800 **\$435**  
EPSON LQ500 **\$750**



**\$125**

Complete with software, able to  
support and run E.G.A. monitors.  
Complete with menu and paint  
programmes

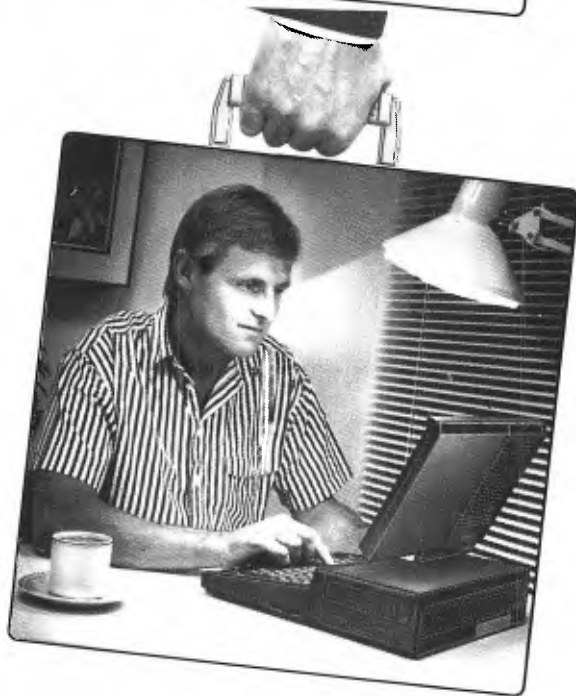
DEALER ENQUIRY WELCOME

CELEBRATING  
OUR 13th  
YEAR

IBM IS REG. TRADEMARK OF INTERNATIONAL BUSINESS MACHINES  
MS DOS IS REG. TRADEMARK OF MICROSOFT CORPORATION  
PC/XT PC/AT IS REG. TRADEMARK OF IBM  
PRICES SUBJECT TO CHANGE WITHOUT NOTICE.



# MAKE LIGHT WORK OF BUSINESS



A Sharp laptop computer puts you in control – wherever you do business. The brilliant Sharp Laptops provide all the power, all the features of full size desktop computers but in the lightest weight, totally portable package.

Purchase a Sharp Laptop before December 31 and we'll give you the "Let's Get Started with MSDOS" software from Intouch Tutorials, plus Wordstars' "Easy" wordprocessing software package . . . absolutely Free. Other tutorial packages are also available. Make light work of business. Call us now for your free brochures and complete information.

## FREE OFFER\*



\* Only from participating Sharp dealers.  
Excludes Govt. contracts.

**(008) 074 155 ext 600** 24 hrs 7 days



**SHARP**  
COMPUTERS

LEONARD & ROSE LTD.



# WE WERE CAUGHT WITH OUR PANTS DOWN

**SO NOW WE'LL PAY YOU AN EXTRA \$100  
FOR EVERY TIME YOU TRY TO DO IT AGAIN.**

Your demand for the mighty popular, high performing Thomson 4470 EGA Monitor well and truly caught us with our pants down. We knew it was the best EGA Monitor on the market and we did make big allowances for its popularity but blew it. There are plenty of red faces in our orders department.

**We've fixed all that! We now have 6,000 units instantly available. And to sweeten the deal we'll let you have them for \$100 less than our previous price. We just love getting caught with our pants down.**

**\*Retail price \$920.00 (tax inc.)**



## PEAK ▲

Distributed in Australia by Peak Pacific  
**Dealer Enquiries**

Sydney: 3A/12 Frederick Street, St Leonards. 2065. Fax (02) 439 3040  
Telephone (02) 437 5566

**Sales Offices**

Sydney: 272 Pacific Highway, Crows Nest. 2065. Fax (02) 437 4686  
Telephone (02) 437 4511

Melbourne: 820-824 Whitehorse Road, Box Hill. 3128.

Fax (03) 890 7425 Telephone (03) 890 7590

Brisbane: Expo Centre, 25 Donkin Street, West End. 4101.

Fax (07) 846 1465 Telephone (07) 844 1077

Canberra: Suite 3, 77 Gladstone Street, Fyshwick. 2609

Fax (062) 80 7325 Telephone (062) 80 1803



# SpectraSoft

With some of the **CHEAPEST** prices  
in Australia.  
Order now for XMAS.

## SOFTWARE

|                                  |               |
|----------------------------------|---------------|
| Ability Plus .....               | \$350         |
| <b>Attache 4</b> .....           | <b>\$820</b>  |
| BookMark .....                   | \$195         |
| Borland Quattro .....            | \$295         |
| <b>Borland Sprint</b> .....      | <b>\$319</b>  |
| Borland Turbo Pascal .....       | \$133         |
| <b>Carbon Copy Plus</b> .....    | <b>\$305</b>  |
| <b>Chief - Accountancy</b> ..... | <b>\$279</b>  |
| Copy II PC .....                 | \$55          |
| dBXL .....                       | \$299         |
| Flight Simulator .....           | \$85          |
| <b>Framework III</b> .....       | <b>\$1099</b> |
| Graph-In-A-Box .....             | \$255         |
| <b>In-House Accountant</b> ..... | <b>\$149</b>  |
| Learning DOS .....               | \$85          |
| Lucid 3D .....                   | \$289         |
| Magician-Graphics .....          | \$359         |
| Mirror - Communications .....    | \$115         |
| Networker Plus .....             | \$359         |
| <b>Norton Adv. Utility</b> ..... | <b>\$185</b>  |
| <b>Norton Commander</b> .....    | <b>\$124</b>  |
| Norton Utilities 4.0 .....       | \$124         |
| Nortons Guide - Basic .....      | \$134         |
| Nortons Guide - C .....          | \$134         |
| Nortons Guide - Pascal .....     | \$134         |
| Paradox 2.0 .....                | \$1199        |
| PC Tools Deluxe .....            | \$119         |
| Printworks .....                 | \$135         |
| <b>Q&amp;A - Database</b> .....  | <b>\$510</b>  |
| QuickSilver .....                | \$790         |
| <b>RBase - Database</b> .....    | <b>\$719</b>  |
| Silk - Spreadsheet .....         | \$345         |
| Supercom .....                   | \$175         |

## MICROSOFT

|             |       |
|-------------|-------|
| Chart ..... | \$549 |
| Excel ..... | \$739 |

|                        |       |
|------------------------|-------|
| Flight Simulator ..... | \$85  |
| Pageview .....         | \$85  |
| QuickBasic .....       | \$120 |
| QuickC .....           | \$120 |
| Windows .....          | \$199 |
| Windows Tool Kit ..... | \$899 |
| Word .....             | \$650 |
| Works .....            | \$284 |

## HARDWARE

### Hardcards

|                            |        |
|----------------------------|--------|
| + Development 20 meg. .... | \$1429 |
| + Development 40 meg. .... | \$2059 |

### Monitors

|                                |        |
|--------------------------------|--------|
| CornerStone 15" .....          | \$2695 |
| CornerStone 15" 4 Levels ..... | \$3295 |
| CornerStone 19" .....          | \$4995 |
| CornerStone 19" 4 Levels ..... | \$5495 |
| NEC JC-1402 .....              | \$1499 |
| NEC JC-1501 .....              | \$2255 |
| Taxan 770 Multisync .....      | \$1795 |

### Netcomm Modems

Call for pricing .....

### Printers

|                         |        |
|-------------------------|--------|
| OKI MicroLine 182 ..... | \$495  |
| OKI MicroLine 292 ..... | \$1495 |
| OKI MicroLine 390 ..... | \$1195 |
| OKI MicroLine 391 ..... | \$1495 |

## November Specials

**FREE copy of  
"Touch 'N' Go",  
the typing tutor, with  
purchases over  
\$499.**

but still has problems more often than any other application you're likely to use regularly. Every version of Font/DA Mover has trouble when it has to repair internal problems and renumber resources (which it does whenever it installs anything) in the same pass. The fix is to double-move all fonts and DAs you want to install. Move them first into a new Font/DA file and then to the target file. The first step is Font/DA Mover's chance to fix whatever it thinks is wrong; the second move is when the necessary resource renumbering occurs.

The new version of HD SC Setup (2.0) adds real partitioning ability, which is absolutely necessary if you plan to run multiple operating systems such as the Mac OS and A/UX.

Much of the partitioning software available from third-party vendors does not create 'real' partitions. That is, the 'partitions' created are really just volumes in one large memory space. Real partitioning requires that the memory areas not be logically linked at any level. Although they reside on the same media, they should behave in all ways as if they were on separate physical disks.

The partitions created by HD SC Setup are real, and you can use one for the Apple Macintosh OS and one for A/UX (when it is completely set up). The partitioning portion of HD SC Setup is intuitive, elegant and effective. When you can get to it, that is. Unfortunately, the program works only with Apple hard-disk drives. It refused to reorganise a PCPC hard disk (that uses the same Rodime mechanism used in the Apple 40SC).

Although we can understand why the program might balk at formatting another manufacturer's drive, this program even denied that a SCSI device was attached. This is the sort of feature or bug that should not have been allowed to slip by.

## Now it does, now it doesn't

The release of System Software Update 6.0 caught many developers by surprise. Apple says this release was given to developers for testing with their products earlier than any previous updates; many developers report they never got the testing copies, however.

As a result, there are widespread compatibility problems. And they don't involve merely games or small products. Lots of the big names were caught with this release. Included on the list are FullWrite Professional, Excel, Microsoft Works, PixelPaint, inBox, 4th Dimension and Radius' monitor control software.

## SpectraSoft

Shop 57, Kippa Ring Village, Kippa Ring, QUEENSLAND, 4020

PH: (07) 203 5378 (07) 284 1766 (07) 284 1364

Fax: (07) 284 2123

If you can find any prices cheaper than ours we'll BETTER IT -  
**GUARANTEED!**

For a full catalogue containing more than 500 products call or send in the coupon. Free technical hotline available. **C.O.D.** welcome.

All prices include Sales Tax. All products carry full warranty. All products sourced from Official Australian Distributor. Prices may change without notice. Freight extra.

Mail to: **SpectraSoft**

P.O. Box 41, Redcliffe, QLD, 4020

Product & Catalogue

Catalogue Only

Please send me: .....

.....@ \$ .....

.....@ \$ .....

.....@ \$ .....

.....Total: .....

Name: .....

Address: .....

.....Post Code: .....

Phone: ( . . ) .....

# INTRODUCING OUR NEW 14" HIGH RESOLUTION VGA MONITOR



Introducing the new Thomson model 460W, a 14" high resolution monochrome monitor designed for use with the IBM PS/2 series of computers and compatible VGA video controllers.

The 460W's ultra crisp white on black (or black on white) display using VGA's capability of displaying many shades of grey makes it the ideal monitor for word processing systems and desk top publishing functions.

And if that's not enough we're offering monitor and microcomputer resellers sales margins never before achieved in Australia. \*Retail price \$395.00 (tax inc.)

**THOMSON**  
COMPUTER MONITORS  
THE MONITOR TO LOOK AT BEFORE YOU LOOK AT A COMPUTER

## PEAK ▲

Distributed in Australia by Peak Pacific  
**Dealer Enquiries**

Sydney: 3A/12 Frederick Street, St Leonards. 2065. Fax (02) 439 3040  
Telephone (02) 437 5566

**Sales Offices**

Sydney: 272 Pacific Highway, Crows Nest. 2065. Fax (02) 437 4686  
Telephone (02) 437 4511

Melbourne: 820-824 Whitehorse Road, Box Hill. 3128.

Fax (03) 890 7425 Telephone (03) 890 7590

Brisbane: Expo Centre, 25 Donkin Street, West End. 4101.

Fax (07) 846 1465 Telephone (07) 844 1077

Canberra: Suite 3, 77 Gladstone Street, Fyshwick. 2609

Fax (062) 80 7325 Telephone (062) 80 1803



# SOME **P's** AND **Q's** FOR YOU TO MIND WHEN BUYING A LAPTOP



THE LX 2000 FROM  
ATRONICS HAS THE LOT

## **P**rice

**\$1795**

Compare; you won't find lower.

## **P**ortability

Six kilos; internal rechargeable battery, and an AC adaptor—a truly 'take anywhere' machine.

## **P**erformance

At 10 MHz the most powerful of the XT range, with a 20 Mb hard disk and 2.6 Mb RAM expansion capacity. Optional internal modem.

## **Q**uality service

Trained staff, on-going support and a comprehensive twelve month warranty, with service by the Honeywell National Service Network.

**Atronic International** also stock a comprehensive range of PC's, AT's, LCD & Gas Plasma Laptops, and 80386 machines, which outdo our competitors on price/performance. All prices include sales tax, and are covered by a comprehensive twelve month warranty, with service by the Honeywell National Service Network.

**XT Turbo-10 MHz**

**\$1,695**

**AT Turbo-12 MHz**

**\$2,295**

**80386-20 MHz**

**\$6,395**  
with Tower Case

**Laptops**

A great range of LCD & Gas Plasma Laptops at extraordinarily low prices.

Mail orders welcome. Call or write for brochures and prices on our complete range (including our extensive range of add-ons and peripherals).



**Bring this advertisement with you and receive our top quality 5 1/4" DSDD disks at 65 cents each. (Limit 20 disks per customer).**



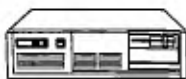
**ATRONICS  
INTERNATIONAL**

228 St Kilda Road, St Kilda, Victoria 3182. Phone: 534 0708 Fax: 537 1810

Also at 14 Balcombe Road, Mentone, Victoria 3194. Phone: 584 1235 Telex: 107 22165 Fax: 584 5253

# SCHMIDT

## Your computer can now be in two places at once...



## or four places at once...



## or anywhere in the world in seconds.

### Schmidt MULTI-SPEED MODEMS

### Add a second user to your PC for \$375\*.

Sure, price is important when choosing a modem. But it isn't the only thing to consider. Signal quality and reliability are essential.

So, Schmidt Multi-speed Modems aren't just built to a price. They're built to perform reliably day after day... to last a lifetime. In fact, we are the only manufacturer prepared to back our claim with a unique **FIVE YEAR WARRANTY**.

If you haven't used a modem before, you may need help getting started. Our toll free 008 hot line is available to help iron out any set up problems you may have.

#### FEATURES

- Model 123 AT supports V.21, V.22, V.23—upgradable to Model 1234 AT
- Model 1234 AT supports V.21, V.22, V.23, V.22 bis
- Hayes compatible dialling
- Auto dial, auto speed ranging, auto answer/disconnect
- Manual dial
- Leased line operation
- V.23 buffered rate converter
- Synchronous & asynchronous
- Monitor speaker & diagnostic testing

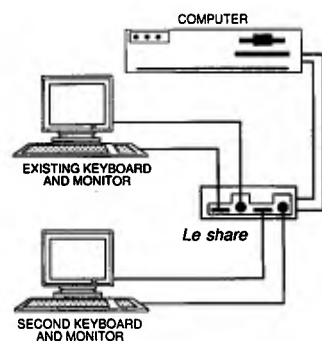
Networking is a great way to add extra users—if you really need it. But why go to the expense of a full multi-user system if you don't always need an extra machine?

Ideal for the office or home, **Le share** allows an IBM PC, XT, AT or compatible to support two keyboards and monitors on a shared basis for little more than the cost of a monitor and keyboard.

And if you need to add even more users, our Terminal Manager system allows you to add up to three extra users with the same flexibility.

#### FEATURES

- Installs in seconds
- No internal PC card
- No mains power required
- Share data between two users
- Supports monochrome and colour monitors
- Operates with most networks and operating systems
- No special software or changes to existing software required
- Hundreds of applications including home, offices, point of sale, reception, accounts



Patent Pending



**The easy, low cost solution to  
expanding computer requirements.**



Schmidt Electronic Laboratories  
142 Chapel Street, St Kilda. 3183  
Facsimile: (03) 531 9015  
Telephone: (03) 531 8011  
Toll Free: (008) 33 5086

PROUDLY AUSTRALIAN

\* Recommended retail price for Le share

Le share is a registered trademark of de Vere Australia. IBM, PC, XT & AT are registered trademarks of International Business Machines. Hayes is a registered trademark of Hayes Corporation. Terminal Manager is a trademark of Schmidt Electronic Laboratories.

cormoran/SEL003



# A.T.S.

## COMPUTING

for  
consistently

## LOWER PRICES

on

## EPSON NEC AMSTRAD SAMSUNG ATARI

EPSON AX2 with EGA colour monitor, 40Mb hard disc  
PLUS LQ Printer: **\$5350** inc. tax

NEC 12MHz 40Mb Powermate 1 PLUS **\$5995** inc. tax

EPSON 20Mb AT-compatible battery lap top portable  
PLUS LQ Printer: **\$5295** inc. tax

SAMSUNG 40Mb AT with EGA colour, PLUS 2 colour  
network stations complete with software **\$9750** inc. tax

SAMSUNG 12MHz 80286 32Mb voice coil hard disk lap  
top PLUS LQ500 Printer: **\$5495** inc. tax

**NEC, EPSON, AMSTRAD, ATARI**  
**computers and printers — phone for**  
**best deals**

**SYDNEY: (02) 868 5222**

123-127 Midson Road, Epping, 2121

**BRISBANE: (07) 862 1944**

24 Sandgate Road, Breakfast Creek, 4010

**ELSEWHERE: (008) 25 1837**

## CHECKOUT

FullWrite's problem would be cute, if it weren't so deadly. What happens is its documents turn into thesaurus files and can't be opened. Ashton-Tate has sent registered owners a fix and has further advised that you can avoid the problem by always keeping documents outside the folder in which the application is stored.

The Excel problem is more complicated. Microsoft has said that Excel users should get the new version 1.5 to ensure compatibility; however, that upgrade is not free to most owners. Microsoft has also said that any version of Excel prior to version 1.06 "will probably not work with 6.0."

Acius also promptly released a fixed version of 4th Dimension. That version is 1.0.6 and is free to registered owners. A new System 6.0-compatible version of PixelPaint 1.1 is expected soon. Radius and Symantec (publishers of inBox) have also promised that patches will be out soon.

There are certainly other programs that will have problems with System 6.0. In most cases, the problems will arise because the developers did not heed Apple's advice to 'play by the rules' when developing their applications.

This release has a lot of bugs, however — mostly small but still bugs. Many users have reported higher than usual numbers of crashes and freeze-ups. It's not always possible to determine if a problem has been caused by an incompatibility or by a System software bug. Our testing, over the course of four weeks, didn't show any unusual problems that we could attribute to the System software, but we might have been very lucky.

### *Put up or shut up*

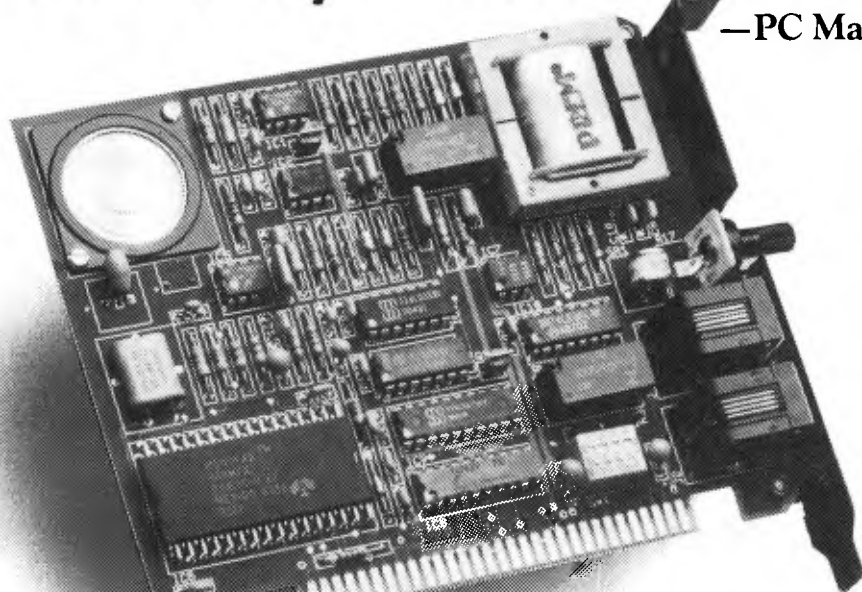
We recommend that you approach this first release of System 6.0 with caution. If you don't need or want its new features, don't install it. After all, there's a small matter of compatibility with other applications. Apple has just released version 6.0.2, which is a bug fix for the Colour Manager, Script Manager and Sound Manager portions of the System file 6.0.

Some of you do need this update. If you use MultiFinder regularly, get the update at once. MultiFinder version 6.0 is much more stable than MultiFinder version 1.0. To use version 6.0, you'll also need to install the new System and Finder. Even more of the resources MultiFinder uses have migrated to the System file from the MultiFinder file.

Keep in mind that you can use the ancillary bits and pieces independently of

# "Simple To Use, Works Well And Best Of All Is Easy On The Budget"

—PC Magazine



## From under \$1,000 JT Fax By Asher

Send facsimiles with your PC/XT/AT or compatible and one of Asher's JT Fax products.

Helpful menus and loads of versatile features make the JT Fax easy to use and you can add your letterhead and signature to documents automatically.

### Fax To Go

If you're on the go, consider the JT Fax Portable. It slips into your pocket and plugs into any MS DOS portable's serial port to let you fax from wherever you are.



### Common Interface

The JT Fax half card internal shares a common software interface with the JT Fax Portable and even the lightning fast JT Fax

9600, the lowest-priced 9600-baud adapter. With the LAN operating software, the JT Fax 9600 is perfect for shared use on a network.

So you can support dozens of word processing, spreadsheet, and graphics packages while sharing the same interface with others in your organization.

### Unique Technical Approach

JT Fax was nominated for PC Magazine's Technical Excellence Award. And in selecting JT Fax Editor's Choice, PC Magazine said "An innovative approach is

the key to the success of JT Fax: it converts documents on the fly while transmitting them at half the speed of the other units. This approach keeps its cost down and saves file storage space, without degrading image quality and without delaying typical transmission times appreciably."



NOMINATED 1987

Take a look at the JT Fax that meets your needs and see why JT Fax has been receiving such high praise.

Call us for information.

G.P.O. BOX 2672, BRISBANE 4001.  
PHONE (07) 221 2869 FAX (07) 221 0421

AUSTRALIAN DISTRIBUTOR



Trademarks (US) J.T. FAX/QUADRAM (ASHER)



# OPENING SALE!

## Central Point Systems

### Personal Computing at a Budget Price

#### SAVE

#### ON PRINTERS

Central Point Systems offer a complete range of printers including OKI, Star, Fujitsu and Brother at unbeatable prices in one central location.

OKI Printer Range From

**\$385**



Free cable  
and printer stand

#### SAVE

#### ON PERSONAL COMPUTERS

Test drive before you buy from our huge range of desk and laptop computers including Mitac, Ultra Paragon and Amstrad in one central location.

Amstrad Laptop From

**\$1099**



#### SAVE

#### ON SOFTWARE

Central Point Systems offer experienced advice on a huge range of software including Borland, Microsoft, Lotus, Norton, Quattro and Chief, especially for small business from one central location.

Quattro

**\$265**



ALL THE ACCESSORIES YOU NEED

56 Lygon Street, Brunswick, 3056.

**388 1299**

Fax: 387 9229



COME IN A JOIN  
OUR CELEBRATION  
THROUGHOUT NOVEMBER

# A PORTABLE COMPUTER AT A PRICE TO GET CARRIED AWAY WITH.

INDUSTRY  
STANDARD  
COMPATIBLE

Another amazing offer from Amstrad.

A sophisticated portable computer for the price you'd pay for an ordinary desktop computer.

The PPC512 is fully compatible with all the best-selling PC software. And, unlike most other portables, it has a fully spaced, 102 key, AT-style keyboard to make full use of it.

It's portable, too, in the truest sense of the word and can be operated from the electric mains, from a PC1640 monitor, from standard batteries or from the cigarette lighter of a car.

Back in the office, its built-in serial interface means it can be used for communication or for transferring data to other PCs and its parallel

interface can connect it to any Amstrad or industry standard printer.

What's more, it comes complete with the latest MSDOS 3.3 plus its own PPC Organiser software package, with a diary and an address and telephone directory.

Plus the Amstrad full 12 month warranty.

As if all that wasn't enough, Amstrad are now offering it with a Quad software package which includes spreadsheet, database, wordprocessing and graphics.

Plus a 3 hour "Introduction to Computers" training course with leading business colleges in all mainland State capitals.

Together worth over \$300.

We told you it was an amazing offer! But hurry, the offer only lasts as long as stocks last and already the portables are walking out the door.

SAVE \$300.



\$1099

For further information on the PPC512 and the name of your nearest dealer, send this coupon to Amstrad, P.O. Box 615, Kings Cross, N.S.W. 2011.

Name \_\_\_\_\_ Company \_\_\_\_\_

Address \_\_\_\_\_

Postcode \_\_\_\_\_ Telephone \_\_\_\_\_

APC88

AMSTRAD

For the price, you get the works.



## Documentation

### Macintosh System Software User's Guide, version 6.0

Tutorial: Learning Macintosh Basics  
Basic Macintosh Techniques  
Working With the Finder Desktop  
Finder Menu Commands  
Desk Accessories  
Keyboards  
3.5in Disks  
Hard Disks  
Startup Disks  
MultiFinder  
A History of Mac System Software  
Troubleshooting

### Macintosh Utilities User's Guide

Apple HD SC Setup  
HD Backup  
Disk First Aid  
Font/DA Mover  
Find File  
MacroMaker  
Apple File Exchange  
Apple File Exchange: Advanced Features  
Map  
Special Installation  
CloseView  
Moving Through the File System

the System version you are running. Most do require that you be running System 4.1 at least, but that's it. The programs that fall into this category are CloseView, MacroMaker, Map, all the printer drivers, HD Backup and Disk First Aid. If you're on a multi-user network, all users should update their printer drivers at the same time.

This is the System Software Update that probably shouldn't have been. Apple was under pressure on two fronts to get it out, however, and it did. On one hand, those two manuals were sitting there printed, and they kept referring to the April '88 release. And Apple had made that silly promise to update the System software approximately every six months.

Apple should have waited and added patches to avoid the worst of the compatibility problems. And fixed the bugs. To let marketing and PR considerations determine the release date of System software is wrong. What matters is getting it right. We hope this was a one-time event, and we'll get the good stuff in System Software Update 7.0 — when it is ready.

END

**JUST RELEASED!**  
**GENIUS DYNAMOUSE!**  
**INNOCENT OF MURDER!**  
**THE OTHERS JUST COULDN'T KEEP UP!**

## BEST VALUE RODENT ON THE MARKET GENIUS MOUSE

### High Performance and Dynamic Resolution

Genius Dyna Mouse 100-1050 DPI Resolution gives greater ease and speed in selecting a precise location on the screen.

The Dynamic Resolution is not measured in terms of the physical distance travelled by the mouse but comparatively proportional to the speed of movement of the mouse. The faster the movement of the mouse,

the further the cursor movement on the screen. The slow movement of the mouse allows you to reach the desired exact position.

**Genius Menu Maker & Library** - allows you to create a mouse interface and pop up menu with any software application. It also provides 20 predefined menus for DBASE III, SUPERCALC, LOTUS 123, MS DOS, WORDSTAR, etc.

**Dr. Halo III** - Professional graphics and slide show presentation software. For CGA, EGA, VGA, MGA, PGA and Hercules displays.

| Product          | GM-6 Plus             | GM-6000               | GM-S2     | GM-U2                 |
|------------------|-----------------------|-----------------------|-----------|-----------------------|
| Function         | Microsoft<br>PC Mouse | Microsoft<br>PC Mouse | IBM PS/2  | Microsoft<br>IBM PS/2 |
| Interface        | RS-232                | RS-232                | PS-2 Port | PS-2 Port             |
| Resolution DPI   | 200-800               | 350-1050              | 350-1050  | 350-1050              |
| Button           | 3                     | 3                     | 2         | 2                     |
| Menu Maker       | Yes                   | Yes                   | Yes       | Yes                   |
| Menu Library     | Yes                   | Yes                   | Yes       | Yes                   |
| Dr Halo III      | Yes                   | Yes                   | Yes       | Yes                   |
| Mouse Pad        | Yes                   | Yes                   | Yes       | Yes                   |
| Mouse Pocket     | Yes                   | Yes                   | Yes       | Yes                   |
| 9-25 Pin Adaptor | Optional              | Yes                   | No        | Yes                   |

### COMPARE ITS FEATURES

with any other MOUSE

### COMPARE ITS RELIABILITY

of 1000 GM-6 Mouses sold NONE were faulty

Distributed in Australia by

**XTRATEK CORPORATION PTY LTD**

109 WELLINGTON STREET, WINDSOR, VIC. 3181

Tel: (03) 521 1249 or (03) 525 1836 Facsimile: (03) 525 1836

Importers & Distributors of Computer Componentary & Accessories. Interface Cards, Memory Boards, External drives and more. Enquire about our other products

**Dealer Enquiries Welcome**

**Bulk Dealer Supplies or Single Unit Sales Welcome**

## IBM PC PUBLIC DOMAIN SOFTWARE

over 1400 disks

PC BLUE VOL 1 - 453

PC GOLD VOL 1 - 118

BEST PC PUBLIC DOMAIN 1 - 1000  
new volumes being released monthly  
NO MEMBERSHIP FEES!

**\$10**

All eight  
catalogues  
for \$25.00

per volume

Catalogue disks available

NOW ALSO 3 1/2" (720K) FORMAT

\$13.00 1 VOL/DISK

\$20.00 2 VOLS/DISK

PC Blue \$10 PC Gold \$5

"Best of" (5 disks) \$25

(plus handling and postage \$3 per order)

Bulletin Board (08) 231 9550

**MICRO  
SHACK**

SA PTY LTD

268 Morphett Street, Adelaide 5000  
Ph. (08) 211 8808

# BLUJEM COMPUTERS

**INTRODUCTORY OFFER**

**For 1 Month Only**



**Teco 14" Dual Frequency Mono Monitor with every AT system.**

**OFFICIAL DISTRIBUTORS OF HANNSON COMPUTERS (Singapore)  
12 MONTHS WARRANTY**

- 12MHz AT
- 640K RAM
- 1.2 Mb FDD
- 20 Mb H.DISK
- PARALLEL/SERIAL/  
GAMES PORT

**\$2160 inc tax**

- 16 MHz AT
- 1 MEG RAM
- 1.2 Mb FDD
- 20 Mb H.DISK
- PARALLEL/SERIAL/  
GAMES PORT
- UP TO 4Mb ON  
BOARD
- EMS COMPATIBLE

**\$2495 inc tax**

- 20 MHz AT
- 1 MEG RAM
- 1.2 Mb FDD
- 20 Mb H.DISK
- PARALLEL/SERIAL/  
GAMES PORT
- UP TO 8 Mb ON  
BOARD
- EMS COMPATIBLE

**\$2695 inc tax**

## **XT TURBO, 10MHz, 20Mb H.DRIVE, 360K FDD \$1399**

- |                          |           |                                    |       |
|--------------------------|-----------|------------------------------------|-------|
| • 40 Mb H.Drive, 40Ms    | Add \$245 | • Teco EGA 14" Monitor             | \$685 |
| • 40 Mb H.Drive, 28Ms    | Add \$490 | • Teco Multiscan PS/2 Comp.        | \$910 |
| • Hercules Card          | Add \$25  | • Teco 14" Dual Frequency Monitor  | \$195 |
| • EGA Card               | Add \$199 | • STAR NX24-10 24 pin Printer      | \$699 |
| • Extended Keyboard      | Add \$30  | • National Panasonic 9 pin Printer | \$369 |
| • Teco 15" 9 pin Printer | \$660     | • Teco 15" 24 pin Printer          | \$960 |

**WHILE STOCKS LAST / DEALER ENQUIRIES WELCOME**

**BLUJEM  
COMPUTERS**

**126 Victoria Rd, Rozelle NSW**

**Phone: (02) 555 1524  
555 1526**



# There are three roads to multi-user computing. Only one can guarantee a smooth trip.

Businesses, big and small, have come to rely on Personal Computers. Few can get by with just one. As you exploit the potential of your PCs, the demand for more computing power, storage and terminals will grow too. But bigger systems can also lead to problems if you choose the wrong growth path:

**Does your system stall in heavy traffic?**

**How are file backups handled?**

**Will single user software work reliably with more than one user?**

**Is further expansion expensive?**

There are at least three ways to build a multi-user PC system — Unix/Xenix, a Local Area Network, a clustered CPU system.



## Unix/Xenix Systems

Unix is a great operating system but not for business applications.

Most software is written for DOS so a lot of programs just aren't available in Unix.

Unix is sophisticated, so staff need extra training to use the system effectively.



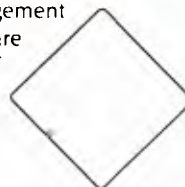
With one CPU doing all of the work, you will find yourself in the slow lane when the workload builds. And even with a fast processor, you'll notice the drop in speed as more users are added.

## Local Area Networking

A LAN is a good way to link existing PCs together to share resources. But LANS are expensive. Each user needs their own PC, network interface and cabling, as well as the file server.

Also, since information moves over a single wire, reading and writing large data files is slow.

And system management can become a nightmare as users keep copies of files on their own systems that are never backed up.



## PC PLUS

ALLOY's PC PLUS combines the best of both worlds.

PC PLUS works with IBM's Personal System/2, PCs, XT's, and AT's, the Compaq 386 and other compatibles.

Each user has a PC SLAVE card and their own terminal.

PC PLUS keeps the CPUs together so data is moved 16 bits at a time — not one. This is enhanced by RAM-based disk caching.



With one processor per user and high speed data transfer, PC PLUS is fast, very fast. And as more users are added, you can be sure that performance won't drop off.

Compatibility is no problem. PC PLUS is DOS, Novell NetWare, and Orchid PC-NET compatible, so your investment in software and staff training are not wasted.

ALLOY's NTNX operating system allows users to share information. System security allows files to be locked or made available to other users, as required. And print spooling is supported so you can share printers.

Processors share common data storage, so system management is easier to handle. In fact, with ALLOY's RETRIEVER Tape Backup System, this can be handled for you automatically. All you need to do is insert the tape. If you would like to know more about PC PLUS, contact your ALLOY dealer now.



Alloy Computer Products (Australia) Pty Ltd,  
5 Enterprise Court, Mulgrave, Victoria 3170  
Phone: (03) 561 4988 Fax: (03) 561 7412

35 Spring Street, Bondi Junction, NSW 2022  
Phone: (02) 369 9229

Please send more information about ALLOY PC PLUS

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

\_\_\_\_\_

POSTCODE \_\_\_\_\_

PHONE \_\_\_\_\_

cormoranALL 003

# Pigeon sort

***Want to sort faster than Quicksort but didn't think it was possible?  
Paul Birch has news for you . . .***

Pigeon sort is a new sorting algorithm based on the recursive pigeon-holing of numbers by value or data by key-value. Its computation time is 'O(N)', which is faster than Quicksort 'O(NlogN)', hitherto the fastest known general-purpose sorting algorithm. Comparative timings are presented below.

When we wish to sort 'N' items into order we can use one or other of a variety of algorithms that take longer or shorter times to perform. Sometimes a slow, crude algorithm (such as the 'Bubble sort') is good enough, but often we need to use the fastest method available.

Quicksort (APC, August 1987, p228) is generally considered to be the fastest known sorting algorithm. It is performed in a time proportional to 'NlogN'. We write this as 'O(NlogN)' which means 'of order N log N'. This may be compared with the simple Bubble sort, which is 'O(N<sup>2</sup>)' and therefore much slower for a large 'N'. There are other 'O(N<sup>2</sup>)' sorting algorithms and there is even a really appalling 'O(N<sup>3</sup>)' sort, which is so bad it has probably never been used! Some algorithms are faster than 'O(N<sup>2</sup>)' and some are 'O(NlogN)', like Quicksort and Heapsort; but most authorities (such as Knuth, 'The Art of Computer Programming') claim that no algorithm faster than 'O(NlogN)' is possible. A search of the literature has turned up no general-purpose algorithms as fast as 'O(N)', though it should be noted that a few restricted kinds of sort on specialised data have been shown to be 'O(N)'.

## Pigeonholes

Pigeon sort is thus presented as a new general-purpose 'O(N)' algorithm, comparable to Quicksort, but faster by 'O(logN)'. It is supplied in the form of a Fortran-77 subroutine that sorts 'N' real numbers into ascending order by value. The subroutine is fully commented and largely self-documenting; it was written in such a way as to simplify translation into other high-level languages.

Post Offices sorting letters into pigeon-

***'The Pigeon sort  
algorithm can be  
implemented with any  
suitable computer  
language or machine.'***

holes by hand use a method quite similar to this algorithm, which proceeds as follows.

Set up an index array to the 'N' items; we shall then sort the index according to the values of its elements, but will not rearrange the items themselves. This step is not absolutely necessary, but it does enable us to perform sorting by data or key values without having to shift around all the possibly extraneous data that may be associated with a given item or record.

Find the maximum and minimum elements and divide the interval between

them into 'N' equal slots (in fact, it will prove more convenient to have 'N+1' slots, the outermost slots at either end being only half the size of the rest). Each element, or more precisely its index, is labelled as belonging in its appropriate slot; and we keep a count of the number of elements belonging in each slot.

After this, some slots will 'contain' no elements, others one, two or more elements. For uniformly distributed random data the expected proportion of slots containing 'm' elements is given by the Binomial Distribution:

$$f(m) = \frac{(N! / ((N-m)! m!)) (1/N)^m (1-1/N)^{N-m}}{\approx 1 / (e \cdot m!)}$$

This implies that about 37 per cent of slots will be empty; that about 37 per cent of elements will find themselves in a slot alone, 37 per cent in pairs, 18 per cent in threes, six per cent in fours, and two per cent in groups of five or more. For non-uniform data the distributions will differ and there may be more slots containing relatively large numbers of elements.

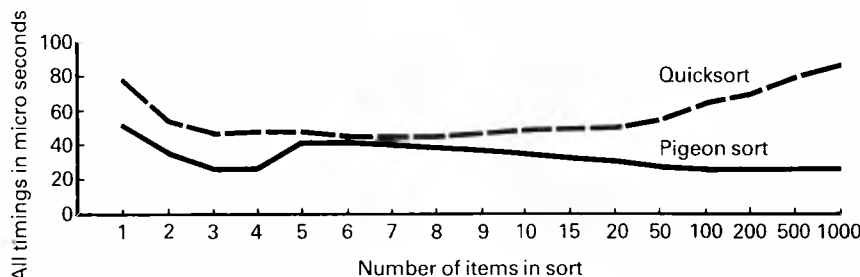
We now define a set of 'N' little pigeonholes into which we shall put the 'N' index elements. We give 'm' little pigeonholes to each slot; that is, just enough space to hold the 'm' index elements labelled as belonging in that slot. Empty slots are deleted. Non-empty slots (containing 'm>0' elements) are given 'm' pigeonholes in sequence. A full pigeon-



Comparative sort timings per item

| N    | Quicksort/ $\mu$ s | Pigeon/ $\mu$ s | Pigeon/Quicksort |
|------|--------------------|-----------------|------------------|
|      | 77.5               | 51.0            | 0.66             |
| 2    | 53.5               | 35.0            | 0.65             |
| 3    | 46.1               | 26.2            | 0.57             |
| 4    | 47.4               | 26.2            | 0.56             |
| 5    | 47.1               | 46.0            | 0.98             |
| 6    | 44.4               | 42.2            | 0.95             |
| 7    | 44.0               | 40.4            | 0.92             |
| 8    | 43.6               | 38.8            | 0.89             |
| 9    | 45.5               | 37.0            | 0.81             |
| 10   | 47.6               | 35.5            | 0.75             |
| 15   | 49.0               | 32.3            | 0.66             |
| 20   | 49.6               | 30.2            | 0.61             |
| 50   | 54.2               | 27.1            | 0.50             |
| 100  | 63.7               | 26.0            | 0.41             |
| 200  | 69.1               | 26.1            | 0.38             |
| 500  | 78.8               | 25.6            | 0.32             |
| 1000 | 85.0               | 26.2            | 0.31             |

- 1) Timings are for optimised Fortran-77 subroutines on a DEC VAX 11/785 with Floating Point Accelerator, over  $10^5$  items of uniformly distributed random data.
- 2) Quicksort time  $\sim 8.5\mu\text{s} \cdot N \log_2 N + 15\mu\text{s} \cdot N + 62\mu\text{s}$ .
- 3) Pigeon sort time  $\sim 26\mu\text{s} \cdot N + 54\mu\text{s}$ .
- 4) On extreme non-uniform data in  $[0, 10^{-37}]$  the timing for Pigeon sort with  $N = 100$  is  $125\mu\text{s}/\text{item}$  (sort time of 12.5ms) which is about 5 times slower than for uniform data.



hole is considered to cover the 'm' little pigeonholes, which contain the 'm' index elements in arbitrary order. This pigeonhole will be subdivided into little pigeonholes again in the later stages of the recursive sort.

This rather complex organisation of the pigeonholes is necessary because although we know that exactly 'N' pigeonholes will finally be needed, we do not know from the outset just where in the interval their boundaries will be.

Any pigeonhole containing more than one element is now sorted again, using the same procedure recursively until there is only one element left per pigeonhole.

When ' $m < 5$ ', the process is allowed to terminate with special explicit sorts for extra speed, although the recursion would still work without them. Identical elements left in a pigeonhole (when minimum and maximum values are equal) are not sorted any further.

It is apparent that each element will have to be examined and pigeonholed about 1.65 times ( $= 1 + 0.37 + 0.18 + 0.06 + 0.02 \times 1.65$ ) on average, for uniform ran-

dom data, so the computation time is ' $O(N)$ '.

## Speed benchmarks

Both Pigeon sort and Quicksort have been implemented in optimised Fortran-77 on a DEC VAX 11/785 machine with a Floating-Point Accelerator, and comparative timings have been tabulated.

Each measurement was obtained by generating 100,000 uniformly-distributed pseudo-random numbers; these were taken and sorted 'N' numbers at a time. The total computation time was then divided by 100,000, giving the sorting time per item, which should be constant for an ' $O(N)$ ' algorithm and increase as ' $\log N$ ' for an ' $O(N \log N)$ ' algorithm. The time taken to generate the data was not included.

The table shows that the measurements confirm the predicted trends, except for overheads in the subroutine calls that become less important as 'N' increases.

In the Pigeon sort timings we can easi-

ly see the effect of the special sorts for ' $m < 5$ '. Note that Pigeon sort is always quicker than Quicksort and that, apart from the limited region ' $5 \leq N \leq 8$ ', the differences are quite significant. Smoothed empirical expressions for the total sort time are given in the notes to the table.

In the worst case, computation can be considerably slower, ' $O(N^2)$ ' for small values of 'N'. (Quicksort also has worst-case behaviour of ' $O(N^2)$ '.) Consider data that is hierarchically distributed in value, such that each element is about '2N' times smaller than the value of the next larger element. Then each step of the recursion will only reduce the number of elements in the bottom pigeonhole by one, and all but two slots will be empty; thus the total number of pigeonholing operations should be ' $\sim N^2/2$ '. However, in a computer implementation, only a finite range of data values is generally possible. Thus, the total number of recursions is limited by the finest resolution or the smallest magnitude of the data values: if the range of distinct values is given by the ratio ' $2^k$ ', we find that the maximum depth of recursions is ' $k/\log_2(2N)$ '.

This means that the worst-case computation starts at ' $O(N^2/2)$ ' for ' $N < k/\log_2(2N)$ '. For higher 'N' we have performance of ' $O(Nk/\log_2(2N))$ ' up to ' $N = 2^{k-1}$ ', at which point only one recursion is possible; thereafter the algorithm becomes ' $O(N)$ ' again. Thus, even for the worst case the asymptotic behaviour is ' $O(N)$ ' when the range or precision of values is limited.

Measurements on extreme non-uniform (hierarchical) pseudo-random data in the interval  $[0, 10^{-37}]$  show that the timings for such 'worst-case' data are up to about five times slower than for more uniform or 'average' data.

## Integer sorting

If it is known in advance that the data values are likely to have such extreme distributions, and speed is of the essence, it may be wise to modify the data first, transforming it into a more uniform distribution. We might decide to use the logarithm of the real data values, but a faster procedure could be to sort on integer values made from the binary exponent and the fractional part of real floating-point numbers.

The Pigeon sort algorithm can be implemented with any suitable computer language or machine, but the best methods may vary. Users of computers without floating-point coprocessors are likely to find the pigeonhole calculations (using real floating-point multiplications) rather slow; if so, we can speed up the procedure by using integer arithmetic. In

# THE CLOSEST THING TO THE IMAGE QUALITY OF A TECMAR VGA CARD.



*This is a rather graphic demonstration of how clearly you can demonstrate your graphics.*

*You see, the Tecmar VGA Card puts all the crispness of IBM PS/2 graphics into IBM XT, AT PC's. OK?*

*To put things a little more clearly, Tecmar's VGA Card supports 800 x 600 quality video*

*resolution in 256 colours. (That's more than 36 rainbows worth).*

*Which means your graphics will turn out sharp enough to cut your fingers on.*

*And because of Tecmar's renowned reliability, you and your PC can be assured of a long, colourful history.*

*In fact, every card comes complete with a two-year warranty. As well as all the software and manuals you need.*

*For an even clearer picture of what the Tecmar VGA Card can do for you, call IPL-Datron.*

*We guarantee you won't see yourself using anything less.*

DISTRIBUTED BY IPL-DATRON PTY. LTD. HEAD OFFICE: 19-25 WYNDHAM STREET, ALEXANDRIA, NEW SOUTH WALES 2015. TELEPHONE: (02) 698 8211 MELBOURNE: 25 PALMERSTON CRESCENT, SOUTH MELBOURNE, VICTORIA 3205. TELEPHONE: (03) 690 9855 BRISBANE: 32 RAILWAY TERRACE, MILTON, QUEENSLAND 4064. TELEPHONE: (07) 368 3292.

OMONI/IPL 02

**IPL TECMAR**



## AUTOMATIC PRINTER SHARER

*From the manufacturer of the popular Blitzer range of Modems comes a family of handy Printer Enhancement Products (PEPs).*

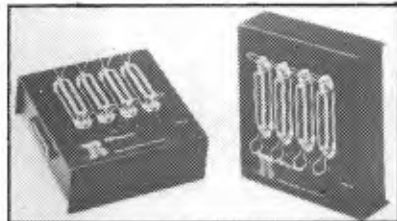
PEPsharer, the Automatic Printer Sharer, automatically connects up to four parallel printer channels to a printer, on demand. No manual switching is needed. The four input channels could be from four computers or from a mixture of computers and any other PEP.

The input channels are polled sequentially until data is found on one channel. This active channel is then switched to the printer (or output channel), and the other channels are locked out. After data transfer has ceased for a period of time, sequential polling recommences.

PEPsharer has no operational controls or commands as everything is automatic. The function performed by PEPsharer can also be fulfilled by PEPnet but PEPsharer provides a lower cost solution when the computers are close to the printer to be shared.

- Centronics Parallel interface compatible, all signals processed, even the rarely used ones.
- Four input channels, one output, inputs polled sequentially.
- The polling rate and release time are switch selectable to accommodate differing installation requirements. Once set for a particular installation, the settings do not need to be altered.
- There is one Status Indicator for each channel to indicating polling and the selected channel.
- All data is handled transparently by PEPsharer so graphics data may be printed without difficulty.
- The input connectors are Centronics sockets to suit the printer end of any parallel printer cable.
- The output connector is a 25pin D type to suit a standard IBM PC printer cable.
- Approval now obtained.
- PEPsharer comes packaged in a smart full color box with:
  - A/C Power Pack
  - Wall mount screws (the box has a built in wall mount base plate)
  - Desk mount rubber feet
  - Printed Manual in Proper English

\$295



The PEP family also includes:

- PEPbuffer** - A smart 256kb parallel buffer with a multiple copy facility
- PEPswitch** - To switch between printers from your keyboard
- PEPnet** - The single cable printer sharer system, consisting of 1 master, from 1 to 30 slaves
- PEPchex** - To establish a parallel link with a printer up to 1,000 metres away from your computer.



**MIKE BOORNE  
ELECTRONICS  
PTY. LTD.**

Suite 3, 61A Hill Street, Roseville,  
N.S.W. 2069

P.O. Box 8, Turrumurra,  
N.S.W. 2074

Phone: (02) 46 3014, (02) 416 9168  
Fax: (02) 416 9082

Aggressively Structured dealer prices.

## PROGRAMMING

this case, real floating-point numbers are actually stored as . . . integers! In the IEEE standard a real number is represented as a 4-byte word in which the 32 bits are allocated (from most to least significant bit) as a sign bit, an 8-bit binary exponent biased by 127, and a 23-bit mantissa with an implied 1 in the most significant (24th) bit.

It is therefore possible to form integers or other data types which preserve the order of the floating-point numbers (least to greatest) by picking up the appropriate bits and bytes, without any actual calculation. Thus, all keys or data values can be put into a form that allows pigeonholing to be performed as quickly as possible for the particular computer

SUBROUTINE PIGEON\_SORT(P,IP,N)

```

*****
* This subroutine sorts N real items by value by a sorting algorithm
* using pigeonholes. The data for sorting is in the array P(*), which
* is UNCHANGED on exit; the index array IP(N) contains on exit the
* sorted index to the array, such that element P(IP(1)) is the smallest,
* and P(IP(N)) is the largest. This index must be a valid index to the
* array on entry; any valid index will do. That is, IP(N) must contain
* every required element of P exactly once; such an index can be set up
* simply if necessary by the code "do i=1,n ip(i)=i enddo". Note that
* the array P need not contain just N elements; it may contain either
* more elements or less.
* The algorithm works as follows:
* The interval between the maximum and minimum element is divided into
* N equal slots; then each element is put in its appropriate slot.
* After this some slots will contain no elements, others one element,
* others two, and so on; for uniformly distributed random data the pro-
* portion of slots with m elements in them is given by the Binomial
* Distribution f(m) = (N!/((N-m)!m!))*((1/N)**m)*((1-1/N)**(N-m)).
* For reasonably large N>m this is approximately 1/(e*m!). Thus the
* proportion of datapoints that end up in a slot containing m elements
* is approximately (1/(e*(m-1)!)); that is, about 37% are alone, 37% in
* pairs, 18% in threes, 6% in fours, 2% in fives and above. The non-
* empty slots or pigeonholes are sorted again by the same procedure
* recursively, except that for m<5 the sort is done explicitly. The
* computation time is thus O(N) for random data. The worst case can
* occur when the data is distributed hierarchically in magnitude and
* is O(N**2) for small N, becoming O(N) again for large enough N, when
* the slot-size reaches down to the resolution or smallest magnitude of
* the data-values. If the data is likely to be highly non-uniform it
* may be wise to modify it first, such as by sorting on integers made
* from the exponent and fractional parts of real floating-point numbers.
*****

```

Paul Birch 24th Feb 1988

```

*****
PARAMETER (NMAX=1024)
INTEGER N
DIMENSION P(*)
INTEGER IP(N),
$ IPP(NMAX),
$ NO_IN_PIG(NMAX),
$ NO_OF_SLOT(NMAX),
$ NO_IN_SLOT(0:NMAX),
$ NPIG(0:NMAX+1)
REAL PMIN,
$ PMAX,
$ SLOT

!Maximum value of N or size of array P
!Number of elements in P(N) for sorting
!Assumed size array of data for sorting
!Variable-sized index to order of data P
!Working index to P; only N elements used
!Number of elements in pigeonhole
!Number of slot for element during sort
!Number of elements in slot during sort
!Number of pigeonhole for sort-slot
!Minimum element of P in current sub-sort
!Maximum element of P in current sub-sort
!Reciprocal of slot-size used in sub-sort

INTEGER I,
$ ISTART,
$ ISTART1,
$ ISTART2,
$ ISTART3,
$ IEND,
$ ITEMP,
$ IP0,
$ IP1,
$ IP2,
$ IP3
INTEGER J

!Index used to move through IP(1)
!First value of I in current sub-sort
!Working index = istart+1
!Working index = istart+2
!Working index = istart+3
!Last value of I in current sub-sort
!Temporary store to swap elements of IP
!Temporary store holding IP(istart+0)
!Temporary store holding IP(istart+1)
!Temporary store holding IP(istart+2)
!Temporary store holding IP(istart+3)
!Index used to move through slots

```

```

ISTART=1
NO_IN_PIG(1)=N

```

```

DO WHILE (ISTART.LT.N)
Sort elements into slots moved into pigeonholes recursively until the
pigeonhole contains <=4 elements, which are then sorted directly.
DO WHILE (NO_IN_PIG(ISTART).GT.1)
IF (NO_IN_PIG(ISTART).GT.2) THEN
IF (NO_IN_PIG(ISTART).GT.3) THEN
IF (NO_IN_PIG(ISTART).GT.4) THEN
IEND=ISTART+NO_IN_PIG(ISTART)-1
ISTART1=ISTART+1
PMAX=P(IP(ISTART))
PMIN=PMAX
DO I=ISTART1,IEND
IF (P(IP(I)).GT.PMAX) THEN
PMAX=P(IP(I))
ELSE
IF (P(IP(I)).LT.PMIN) PMIN=P(IP(I))
ENDIF
ENDDO
IF (PMAX.EQ.PMIN) GOTO 100 !All values equal; skip sub-sort
SLOT=NO_IN_PIG(ISTART)/(PMAX-PMIN)
DO I=ISTART,IEND

```

continues. . .

MELBOURNE: (03) 329 2555  
 FAX (03) 329 2279  
 GEELONG: (052) 21 8566  
 TOWNSVILLE: (077) 21 1743  
 FAX (077) 72 4459  
 NOWRA (044) 21 6913



**MICRODOS**  
 COMPUTERS AUSTRALIA

**Head Office:**

Melbourne: 279 Victoria St. W. Melbourne. 3003

**Geelong:**

Shop 3, Belchers Arcade,  
 171-181 Moorabool St, Geelong, 3220

**Townsville:**

Shop 3, 134 Charters Towers Rd,  
 Hermit Park, Townsville, 4812

**Nowra:**

Shop 3, 144 Junction St, Nowra, 2541

**12 MONTHS  
 WARRANTY**

**SOFTWARE, HARDWARE AND PERIPHERALS FOR  
 BUSINESSES, OFFICES, HOMES, SCHOOLS AND FACTORIES**

**12 MONTHS  
 WARRANTY**

# 16MHz AT's 20MHz

## MPC-286<sup>16</sup>

**Features:**

- 80286 12 CPU
- 640Kb on board RAM (Expandable to 4MEG)
- 6-8-12-16MHz Switchable Clock Rate
- 20Mb Hard Disk
- 8 Expansion Slots
- 1.2Mb Floppy Disk Drive
- Speed Display Case
- Serial, Parallel and Games Ports

**\$2499  
 NEW RELEASE**

## MPC-286<sup>20</sup>

**Features:**

- 80286 16 Harris CPU
- 1024K RAM (Expandable to 4 meg)
- 8-10-16-20MHz switchable clock speed
- 40Meg Hard Disk
- Speed Display Case
- 1.2Mb Floppy Disk Drive
- 360K Floppy Disk Drive
- Enhanced Keyboard
- Serial/Parallel/Games Ports
- (All speeds rated at 1 Wait State)

**\$3999  
 NEW RELEASE**

## \*SPECIAL\* MPC-88<sup>5</sup>

**Features:**

- 8088-2 CPU
- 360Kb Floppy Drive (National)
- 4.77 or to 8Mhz switchable clock rate
- 256Kb RAM
- 8 Expansion slots
- 150W Power supply
- Composite Monitor included
- Serial/Parallel/Games Port

**\$999**

## XT's MPC-88<sup>10</sup>

**Features:**

- 8088-2 CPU
- Two 360Kb Floppy Disk Drives
- 4.77 - 10MHz switchable clock rate
- 640Kb RAM
- 8 Expansion Slots
- 180W Power supply
- Composite Monitor
- 0 Wait State
- Serial/Parallel/Games Ports

**\$1699**

## MPC-386<sup>20</sup>

**Features:**

- 32 Bit Motherboard
- 2Mb RAM (Expandable to 10Mb)
- 44Mb Voice Coil Hard Disk
- (Multi-sync) Monitor and card
- 1.2Mb Floppy Disk Drive
- 360K Floppy Disk Drive
- Speed display Tower Case or Deluxe Case
- Enhanced Keyboard
- 4.77 8-10-12-16-20MHz switchable clock speed
- Serial/Parallel/Games Port

**386's**

**\$7495**

**ALL PRICES TAX INCLUDED**

### FROM OUR BUDGET CORNER

**\*SPECIALS - SPECIALS\***  
 10MHz TURBO 640K XT WITH  
 COMPOSITE MONITOR

**\*\*\*\$1299\*\*\***

**COMPLETE (TUARA)  
 DEMO COLOUR MONITOR  
 UNTIL SOLD OUT FROM**

**\*\*\*\$349\*\*\***

**(6 MONTHS WARRANTY)**

**MONITORS from \$155 EGA from \$999 incl. card**

**HARD DISKS from \$445**

**ACCESSORIES \$Call**

Prices subject to change  
 without notice





## 3 1/2" FLOPPY DRIVES THE NEW STANDARD FOR PC/XT/AT + COMPATIBLES -

AT OUR **LOW** PRICES YOU CAN'T  
AFFORD NOT TO UPGRADE

AUTHORISED  
DISTRIBUTOR OF **MAST** Technical  
Excellence

### All M.A.S.T. products feature:

- FUJITSU drive mechanisms - from Japan's leading computer company
- SUPER SLIMLINE - only 1" high
- QUIET
- VERY LOW STANDBY POWER - 6mA
- 12 MONTH WARRANTY

3 1/2" INTERNAL DRIVE -  
INCLUDES 5 1/4" MOUNTING KIT!!!



|     | RRP   | OUR<br>LOW PRICE |
|-----|-------|------------------|
| 1Mb | \$210 | \$189            |
| 2Mb | \$259 | \$239            |

### 3 1/2" EXTERNAL DISK DRIVES

includes quality round cable and attractive  
metal case

#### UNIDRIVE

|        | RRP   | OUR<br>PRICE |
|--------|-------|--------------|
| 1Mb x1 | \$279 | \$255        |
| 2Mb x1 | \$349 | \$325        |



#### TWIDRIVE

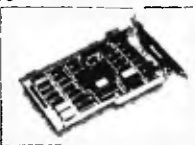
|         | RRP   | OUR<br>PRICE |
|---------|-------|--------------|
| 1Mb x2  | \$489 | \$469        |
| 1Mb 2Mb | \$539 | \$519        |
| 2Mb x2  | \$599 | \$579        |



ADD \$25 IF POWER SUPPLY REQUIRED

### UNIVERSAL FLOPPY CONTROLLER \$149

- Controls four drives - any combination of 3 1/2" & 5 1/4" drives
- Primary or secondary controller
- Passes power to external drive
- Includes software driver so that DOS 2.0 and above will control 3 1/2" drive



### ELECTRONICALLY DOUBLE HARD DISK STORAGE CAPACITY WITH REVOLU- TIONARY PERSTOR CONTROLLER

This is not an RLL controller. It uses ADRT technology and gives a 90-100% increase in storage capacity - simply replace your existing controller.

**\$395**

## BULK DISKS

by major Japanese manufacturer  
3.5" DS DD \$27 for 10

Lifetime guarantee Full surface certified  
\*call for quantity price

### UNBELIEVABLE PRICE BREAKTHRU ON 2400 BAUD MODEM

This fully Hayes Compatible modem features  
2400, 1200, 600 and 300 baud rates. is FULLY  
AUTOMATIC and VERY SMALL.

THE LATEST! THE GREATEST! THE  
CHEAPEST!

**\$325**

## COMPUTER DISCOUNTS

(AUST) PTY LTD

178 PACIFIC HIGHWAY, ST LEONARDS 2065

PH: 436-2600 FAX: 437-4919

OUR MOTTO - THE BEST QUALITY AT THE  
BEST PRICE!

Phone orders welcome. Bankcard, Visa,  
Mastercard

Freight rates \$6 courier \$3.50 airmail  
All prices include tax - subject to change

# PROGRAMMING

```

NO_OF_SLOT(I)=NINT((P(IP(I))-P(MIN))*SLOT)
NO_IN_SLOT(NO_OF_SLOT(I))=NO_IN_SLOT(NO_OF_SLOT(I))+1
ENDDO
NPIG(0)=ISTART
DO J=0,NO_IN_PIG(ISTART)
  NPIG(J+1)=NPIG(J)+NO_IN_SLOT(J)
  IF (NO_IN_SLOT(J).NE.0) NO_IN_PIG(NPIG(J))=NO_IN_SLOT(J)
  NO_IN_SLOT(J)=0
ENDDO
DO I=ISTART,IEND
  IPP(NPIG(NO_OF_SLOT(I)))=IP(I)
  NPIG(NO_OF_SLOT(I))=NPIG(NO_OF_SLOT(I))+1
ENDDO
DO I=ISTART,IEND
  IP(I)=IPP(I)
ENDDO
ELSE
  Do optimal sorts explicitly for small numbers (2-4) in pigeonhole
  ISTART1=ISTART+1
  ISTART2=ISTART+2
  ISTART3=ISTART+3
  IF (P(IP(ISTART)).GT.P(IP(ISTART2))) THEN
    IPTEMP=IP(ISTART2)
    IP(ISTART2)=IP(ISTART)
    IP(ISTART)=IPTEMP
  ENDIF
  IF (P(IP(ISTART1)).GT.P(IP(ISTART3))) THEN
    IPTEMP=IP(ISTART3)
    IP(ISTART3)=IP(ISTART1)
    IP(ISTART1)=IPTEMP
  ENDIF
  IF (P(IP(ISTART)).GT.P(IP(ISTART1))) THEN
    IPTEMP=IP(ISTART1)
    IP(ISTART1)=IP(ISTART)
    IP(ISTART)=IPTEMP
  ENDIF
  IF (P(IP(ISTART2)).GT.P(IP(ISTART3))) THEN
    IPTEMP=IP(ISTART3)
    IP(ISTART3)=IP(ISTART2)
    IP(ISTART2)=IPTEMP
  ENDIF
  IF (P(IP(ISTART1)).GT.P(IP(ISTART2))) THEN
    IPTEMP=IP(ISTART2)
    IP(ISTART2)=IP(ISTART1)
    IP(ISTART1)=IPTEMP
  ENDIF
  ISTART=ISTART3
  NO_IN_PIG(ISTART)=1
ENDIF
ELSE
  ISTART1=ISTART+1
  ISTART2=ISTART+2
  IPO=IP(ISTART)
  IP1=IP(ISTART1)
  IP2=IP(ISTART2)
  IF (P(IPO).GT.P(IP1)) THEN
    IF (P(IP2).GT.P(IP1)) THEN
      IF (P(IPO).GT.P(IP2)) THEN
        IP(ISTART1)=IP2
        IP(ISTART2)=IPO
        IP(ISTART)=IP1
      ELSE
        IP(ISTART1)=IPO
        IP(ISTART)=IP1
      ENDIF
    ELSE
      IP(ISTART2)=IPO
      IP(ISTART)=IP2
    ENDIF
  ELSE
    IF (P(IP1).GT.P(IP2)) THEN
      IF (P(IPO).GT.P(IP2)) THEN
        IP(ISTART1)=IPO
        IP(ISTART)=IP2
        IP(ISTART2)=IP1
      ELSE
        IP(ISTART1)=IP2
        IP(ISTART2)=IP1
      ENDIF
    ENDIF
  ENDIF
  ISTART=ISTART2
  NO_IN_PIG(ISTART)=1
ENDIF
ELSE
  ISTART1=ISTART+1
  IF (P(IP(ISTART)).GT.P(IP(ISTART1))) THEN
    IPTEMP=IP(ISTART)
    IP(ISTART)=IP(ISTART1)
    IP(ISTART1)=IPTEMP
  ENDIF
  ISTART=ISTART1
  NO_IN_PIG(ISTART)=1
ENDIF
ENDDO
ISTART=ISTART+NO_IN_PIG(ISTART)
ENDDO
RETURN
END

```

ends

## PROGRAMMING

system. Variations are also possible in which all the pigeonhole multiplications and divisions are reduced to simple arithmetic shifts; these would be suitable for very fast routines written in assembler or machine code.

Methods for turning real numbers into integers and for optimising the pigeonholing at machine code level are highly machine-dependent. The details are therefore beyond the scope of this article and are left as an exercise for the reader! However, sorting by integer keys is a straightforward variation (mostly just a change of data type) on the subroutine as presented.

Pigeon sort can thus have a considerable speed advantage over other sorting methods. However, this speed is achieved at the cost of extra storage space: we need a total of '6N' integers in index arrays and some working variables, as well as the 'N' data values themselves. We may have difficulties in sorting files with very large numbers of records, but nowadays memory is comparatively cheap and sorts of up to 'N-64k' should be possible on most systems.

It will be apparent that for 'NMAX<2<sup>16</sup>=64k' we could use index arrays of Integer\*2 data-type (that is, 16-bit small integers); the index arrays would then use up to 768k of memory. Add in the Real\*4 data array and we reach 1Mbyte.

No attempt has been made to reduce the storage requirements to the minimum possible: it was felt that this subroutine implements the pigeonholing method in a simple and readily comprehensible way, and that subtle optimisations would probably make it more difficult to understand. Not all of the arrays are used simultaneously throughout the Pigeon sort algorithm, so it is likely that versions could be developed that use fewer index arrays, perhaps by using some additional indirect addressing or assignment steps.

Therefore, we have in Pigeon sort a general-purpose 'O(N)' algorithm for the sorting of data by value — significantly faster than other methods. It is not claimed that this is the most efficient algorithm possible; there is clearly room for improvement in the storage requirements, and probably also in the methods of choosing slot sizes and pigeonholing. (Using only slot sizes that are powers of two might avoid the need for any multiplications here.) Nevertheless, the subroutine has proved useful and reliable in practice, demonstrating that the development of faster and better sorting algorithms is not yet over by any means.

END

### The Amazing ... **MAESTRO** 2400ZXR

Telecom Approved

As Used by -

- Hewlett Packard
- AWA Nortel
- University of Sydney
- Monash University
- Australia Post
- Telecom Australia

# 2400

**B.P.S. FULL DUPLEX  
MODEM**

## \$399.00

**Retail Incl. Tax**

*Money Back Guarantee If Not  
Completely Satisfied Within 14 Days*

Uses the Latest Technology  
D.S.P. Chip-set with  
Performance Equal to or  
Better than Modems Costing  
**\$1600.00 or More!**

### Automatic Everything

Auto-Answer, Auto-Dial,  
Call Progress Monitoring,  
Pulse / Tone Dialling,  
Line Condition Monitoring,  
Hayes Compatible.  
V.21, V.22, V.22bis, V.23  
(300/300, 1200/75, 75/1200,  
1200/1200, 2400/2400)  
V.23 with automatic  
bit rate convertor

Do any of our competitors offer a money back guarantee?

An often asked question by prospective modem purchasers ... "Why is the Maestro modem so inexpensive compared to its 'competitors'?" *Answer from Maestro ...* "Why are other modems so expensive? If you can buy a video recorder for as little as \$499, with all its intricate mechanical and electrical parts, surely something as simple as a modem should be cheaper."

The high demand for the Maestro modems has caused some delays in delivery and placed a heavy burden on our assembly lines. However, all modems still go through an eight hour soak-test to ensure reliability.

#### Important Points:

- easy access to the Maestro Design Team by telephone (no piped music in your ear while you wait half an hour for attention)
- customised ROMs for little or no charge
- 32K of ROM (standard) allows plenty of space for enhancements
- 8 - 32K of battery backed RAM (optional), 8K standard
- 6 months warranty
- out of warranty typical service charge \$35 (compare that with \$250 from some of our competitors)
- 2 separate assembly teams and the purchasing of 1000s of components is bringing our supply time back to overnight delivery
- large dialling menu for often used numbers (requires battery backed option)
- security ring back

Many more features are being added (upgrades available for \$20)

### Model 2400XR

## \$369.00

**Incl. Tax**

V.22, V.22bis  
Bell 103, 212, 2400  
Telecom Approved

#### Features - Automatic Everything and

- Hayes 2400 "AT" command set compatible
- 27 "S" registers
- Extensive self-testing
- Non volatile RAM
- Call progress monitoring
- Uses the latest technology DSP chip-set
- Asynchronous / synchronous

### 1200 Bit Stream Flyer

**\$199.00** • Manual dial  
• Manual answer  
• V.22, Bell 212

Undoubtedly the cheapest  
1200/1200 bps V.22  
modem in Australia

### NOVIX Super Computer

4 MIPS **\$699** kit form  
**\$950** assembled

"The mind boggling power of this board still amazes me. Imagine having all the power of a Dec Vax 11/780 computer, sitting in your hand and being capable of running from a nicad battery. The future is here with us today using the power of the NC series uP chips." Roy Hill "Your Computer," Feb '88

## MAESTRO Pty Ltd

Calool Street, South Kincumber 2256

**(043) 682 277, 682 278**

Phone Your Order NOW

All Major Credit Cards Accepted



# AUSTRALIAN BUILT 8088, 80286, 80386 Based Computers

We import components and build computers in our factory, which we have owned and occupied for 30 years. Thousands of customers like Sydney College of Advanced Education, Cumberland College of Health Science, Monash Uni, University of Technology Syd, Newcastle Uni, Macquarie Uni, Mitchell College, Uni of NSW, Cambridge College, CSIRO, Telecom, OTC, Government, business and private users will testify for our quality and service — as to prices, see for yourself hereunder — all prices include sales tax.

**GCS XT (IBM XT compatible) parallel, serial games port, video card, disk drive controller, clock calendar 150W power keyboard.**

|                            | 4.77— | 8MHZ  | 10MHZ | 12MHZ  | 15MHZ  |
|----------------------------|-------|-------|-------|--------|--------|
| 1 — 360K Disk Drive        |       | \$750 | \$950 | \$1200 | \$1350 |
| 2 — 360K Disk Drive        |       | 900   | 1100  | 1350   | 1500   |
| 1 — 1.2MB Disk Drive       |       | 975   | 1175  | 1425   | 1575   |
| 2 — 1.2MB Disk Drive       |       | 1175  | 1375  | 1625   | 1775   |
| GCS XT 1 — 360K Disk Drive |       | 750   | 950   | 1200   | 1350   |

**GCS AT (IBM AT compatible) parallel, serial ports, clock calendar video cards, 200W power supply, keyboard, no hidden extras!**

|                       | MHZ | 6-8  | 6-10 | 8-12 | 8-16 |
|-----------------------|-----|------|------|------|------|
| 1 — 1.2MB Drive       |     | 1400 | 1600 | 1800 | 2000 |
| 1 — 1.2MB 1-360 Drive |     | 1650 | 1750 | 1950 | 2150 |
| 2 — 1.2MB Drive       |     | 1750 | 1850 | 2050 | 2250 |

3.5" Disk Drives available for the above computers — 720K add \$100, 1.44MB add \$200.

**GCS 386 (IBM 386 compatible) 1 MG RAM, parallel, serial ports, clock calendar, video card, keyboard, legal bios.**

|                 | 16MHZ | 26MHZ |
|-----------------|-------|-------|
| 1 — 1.2MB Drive | 3900  | 4200  |
| 2 — 1.2MB Drive | 4150  | 4340  |

All above computers can be fitted with 3"5" floppy disk drive.

720K - \$200.00, 1.44MB - \$300.00

HARD DISKS WITH DTC (USA) CONTROLLERS

XT MB — 20 \$550, 30 \$650, 40 \$720, 60 \$880, 71 \$1600, 87 \$2100, 110 \$2800, 140 \$3000, 170 \$3600, 210 \$4000, 320 \$4800.  
AT 20 \$720, 30 \$1100, 40 \$1500, 60 \$2000, 71 \$2800, 105 \$3400. TAPE STREAMERS to back-up hard disk — 60MB Japanese \$1300

## "SUPER SPECIAL ... YOU WAIT"

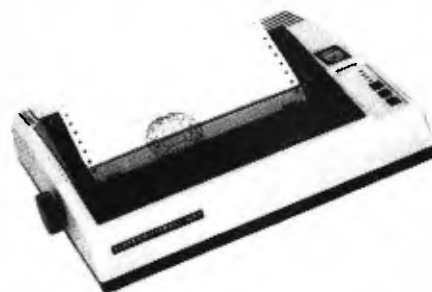
### GCS MONITORS

|            |     |
|------------|-----|
| Composite  | 165 |
| TTL        | 190 |
| Dual Freq. | 220 |
| RGB        | 575 |
| EGA        | 850 |
| Multisync  | 950 |

### DOT MATRIX PRINTERS

Made in Japan — NLQ

|                     |       |
|---------------------|-------|
| 10" 135 cps. 9 pin  | \$395 |
| 10" 160 cps. 24 pin | 640   |
| 15" 160 cps. 9 pin  | 735   |
| 15" 180 cps. 24 pin | 940   |
| 15" 200 cps. 24 pin | 1300  |
| 15" 300 cpl. 24 pin | 1600  |



## SPECIALS

GCS DISKETTES unconditionally guaranteed

5.25" Floppy Diskettes

S/S/D 75c., D/S/D/D \$1, DS 4HD \$3.50

3.5" Floppy Diskettes

720K \$3.50, 1.44MB \$6.00

SUPER MEMORY BOARD

XT \$200 AT \$240

VIDEO CARDS

CGA \$90, HERC. \$120, EGA \$300, VGA \$500

MODEM

ccitt V22/V21 1200/1200 300/300 \$299,

V21/V23 1200/75 \$300, V21/V22 2400/2400

1200/1200 \$550.

MATHS CO-PROCESSORS

8087, \$310, 80287 \$600, 80387 \$1800.

GCS Business Software — a/c payable — receivable, general ledger, stock, payroll, job costing, cash book, point of sales and others. Complete range of IBM and Apple cases keyboard, power supplies, drives main cards RAM's ROM's joysticks mouse modems at Australia's best prices — prompt repair facility and much more.

For detailed description of all our products, call for our free catalogue or send \$2 postage and handling.

# GCS

**SYDNEY:** 67 Blackshaw Ave., Mortdale 2223. Ph: (02) 570 1215, 570 1225

**BRISBANE:** 29 Woodstock Road, Toowong 4066. Ph: (07) 371 3133

**NEWCASTLE:** 653 Hunter Street, Newcastle. Ph: (049) 29 6061

# Resize your EMS RAMdisk

***The amount of memory you can allocate to an expanded memory  
RAMdisk often varies with the application you're running.  
XPANDISK lets you resize your RAMdisk without rebooting.***

If you've been hit with an 'out of memory' message when trying to load a large text file, database or spreadsheet, you're probably already acquainted with the add-in memory boards that embody the Lotus/Intel/Microsoft (LIM) expanded memory specification. Applications written to take advantage of the LIM specification can access up to 32Mbytes of expanded memory.

In addition to providing a bridge across the conventional 640k DOS memory barrier, expanded memory boards invariably supply the software you need to devote part of their resources to the creation of a virtual (or RAM) disk. The XPANDISK.SYS and XPANBOSS.COM utilities presented here will help you make the best use of that RAMdisk.

As far as DOS is concerned, a virtual disk is logically indistinguishable from a formatted floppy or hard disk. You use the same COPY, DEL, DIR, CHKDSK and other DOS commands (with a few exceptions) you would use with a physical disk. But since RAMdisks exist only in memory, they require no time-wasting disk head movement. Moving files to and from a RAMdisk is essentially instantaneous.

The biggest disadvantage of a RAMdisk is its volatility. When you turn off your machine (or get a power-line glitch), the contents of a RAMdisk are lost unless you have also saved them on

magnetic media. For that reason alone, using RAMdisks for data storage is not recommended.

RAM drives are wonderful, however, for storing a copy of your program files. Loading a program that is to be run from a RAMdisk is immediate. All you have to do is copy the program files you regularly expect to use from a physical disk to the RAMdisk (usually in your AUTOEXEC.BAT file) when you boot up.

---

***'To get the maximum  
utility out of your  
expanded memory  
investment, you need a  
RAMdisk that you can  
shrink or expand.'***

---

From then until you shut down, any of these programs can be instantly loaded from RAM. RAM drives are also perfect for storing temporary files, such as the intermediate files created in compiling source code. Besides being faster, using memory for temporary files saves unnecessary wear and tear on physical disks.

XPANDISK.SYS and XPANBOSS.COM address the second

problem with RAMdisks. With all virtual disk drives, the amount of memory you allocate to the drive must be set at boot time and cannot be changed during the session without rebooting the system. A large RAMdisk is needed to store large program files, but a large disk dips into the expanded memory pool needed to run those same programs. When push comes to shove, you are usually forced to give up the RAMdisk or configure it to so small a size as to make it useless.

What you really need is a RAMdisk you can shrink before using a memory glut-ton such as a huge spreadsheet. You also need a RAMdisk you can expand when you leave that task and switch to an editing and compiling session, so it can store the program and the temporary files it creates. This is the way to get the maximum utility out of your expanded memory investment.

XPANDISK.SYS is an expanded memory disk device driver that, under the control of its companion program, XPANBOSS.COM, can do just that. It gives you the ability to change the size of XPANDISK at any time.

## Getting XPANDISK

Both XPANDISK.SYS and XPANBOSS.COM are available for downloading through Microtex (\*6663#) on Telecom's Viatel; or by sending a blank,

## PRODUCTIVITY

XpanDisk is a virtual disk device driver for expanded memory. The driver has the capability of releasing memory allocated to its drive, making it available to other applications. All data is lost if the drive is resized. XPANBOSS.COM is the control program for the XPANDISK.SYS driver. APC Magazine 31-10-88

```

_TEXT      SEGMENT PUBLIC 'CODE'
ASSUME    CS:_TEXT,DS:_TEXT
ASSUME    ES:_TEXT,SS:_TEXT
ORG       0H

;***** DEVICE_HEADER *****
PTRNTER DD -1 ;Minus one indicates one driver.
ATTRIBUTE DW 01000000000000000B ;Block device with IOCTL support.
DEVICE_STAG DW STRATEGY ;Pointer to strategy procedure.
DEVICE_INT DW INTERRUPT ;Pointer to interrupt procedure.
DEVICE_NAME DB 1,7 DUP (?) ;One unit.

REQUEST_HEADER STRUC
HEADER_LENGTH DB ?
UNIT_CODE DB ?
COMMAND_CODE DB ?
STATUS DW ?
RESERVED DQ ?
REQUEST_HEADER ENDS

INIT_PACKET STRUC
INIT HEADER DB (TYPE REQUEST_HEADER) DUP(?)
UNITS DB ?
ENDING_OFFSET DW ?
ENDING_SEGMENT DW ?
ARGUMENTS_OR_ARRAY_OFF DW ?
ARGUMENTS_OR_ARRAY_SEG DW ?
INIT_PACKET ENDS

MEDIA_CHECK_PACKET STRUC
MEDIA_CHECK_HEADER DB (TYPE REQUEST_HEADER) DUP(?)
CHECK_MEDIA_DESCRIPTOR DB ?
RETURN_BYTE DB ?
MEDIA_CHECK_PACKET ENDS

BUILD_BPB_PACKET STRUC
BUILD_BPB_HEADER DB (TYPE REQUEST_HEADER) DUP(?)
BPB_MEDIA_DESCRIPTOR DB ?
BPB_TRANSFER_ADDRESS DW ?
BPB_OFFSET DW ?
BPB_SEGMENT DW ?
BUILD_BPB_PACKET ENDS

INPUT_OUTPUT_PACKET STRUC
INPUT_OUTPUT_HEADER DB (TYPE REQUEST_HEADER) DUP(?)
IO MEDIA_DESCRIPTOR DB ?
TRANSFER_OFFSET DW ?
TRANSFER_SEGMENT DW ?
BYTE_OR_SECTOR_COUNT DW ?
STARTING_SECTOR DW ?
INPUT_OUTPUT_PACKET ENDS

CR EQU 13
LF EQU 10
CTRL_Z EQU 26
SPACE EQU 32
BOX EQU 254

DONE EQU 0100H ;STATUS CODES
WRITE_PROTECT EQU 8000H
UNKNOWN_UNIT EQU 8001H
DEVICE_NOT_READY EQU 8002H
UNKNOWN_COMMAND EQU 8003H
SECTOR_NOT_FOUND EQU 8008H

MAX_COMMAND EQU 12
EOM_FLAG DB 1
REQUEST_PACKET LABEL DWORD
REQUEST_OFFSET DW ?
REQUEST_SEG DW ?

;-----
; The only task of the strategy is to save the pointer to the request header.
;-----
STRATEGY PROC FAR

MOV CS:REQUEST_OFFSET,BX ;Request header address is
MOV CS:REQUEST_SEG,ES ;passed in ES:BX.
RET

STRATEGY ENDP

;-----
; The interrupt procedure will be called immediately after the strategy.
;-----
INTERRUPT PROC FAR

PUSH AX ;Responsible for all registers.
PUSH BX
PUSH CX
PUSH DX
PUSH DS
PUSH ES
PUSH SI
PUSH DI
PUSH BP
PUSHF

CLD ;All string moves forward.
PUSH CS ;Point to our data.
POP DS

CMP EMM_FLAG,1 ;Was EMM found?
MOV AX,UNKNOWN_UNIT ;Assume no.
JNZ EXIT ;If not expanded manager, exit.

LES DI,REQUEST_PACKET ;Retrieve request header pointer.
MOV BL,ES:COMMAND_CODE[DI] ;Retrieve command.
CMP BL,MAX_COMMAND ;Do we support it?
MOV AX,UNKNOWN_COMMAND ;Assume no.
JA EXIT ;If out of range, exit.

XOR BH,BH ;Zero in high half of command.
SHL BX,1 ;Convert to word pointer.
CALL DISPATCH_TABLE[BX] ;Go do our thing.

EXIT: LDS DI,REQUEST_PACKET ;Retrieve request header pointer.

```

```

OR      AX,DONE
MOV     STATUS[DI],AX      ;Tell DOS we are done.

POPF    ;Restore rest of registers.
POP     DI                 ;Restore registers.
POP     SI
POP     ES
POP     DS
POP     DX
POP     CX
POP     BX
POP     RET                ;Far return back to DOS.

INTERRUPT  ENDP

EVEN
MIN_RESIDENT EQU $

DISPATCH_TABLE LABEL WORD

DW  INIT, MEDIA_CHECK, BUILD_BPB, IOCTL_INPUT, INPUT
DW  INPUT_NOWAIT, INPUT_STATUS, INPUT_FLUSH, OUTPUT
DW  OUTPUT_VERIFY, OUTPUT_STATUS, OUTPUT_FLUSH, IOCTL_OUTPUT

BOOT_RECORD LABEL BYTE
DB 3 DUP (0)
DB "XPANDISK"

BIOS_PARAMETER_BLOCK LABEL BYTE

BYTES_PER_SECTOR DW SECTOR_SIZE_DEFAULT
SECTORS_PER_CLUSTER DB 1
RESERVED_SECTORS DW 1
NUMBER_OF_FATS DB 1
ROOT_DIRECTORY_ENTRIES DW ROOT_ENTRIES_DEFAULT
TOTAL_SECTORS DW 1024 / SECTOR_SIZE_DEFAULT * DISK_SIZE_DEFAULT
MEDIA_DESCRIPTOR_BYTE DB MEDIA_DESCRIPTOR -
SECTORS_PER_FAT DW 1
SECTORS_PER_TRACK DW 8
NUMBER_OF_HEADS DW 1
HIDDEN_SECTORS DW 0

BOOT_RECORD_LENGTH EQU $ - BOOT_RECORD

MEDIA_DESCRIPTOR EQU 0FEH
DISK_SIZE_DEFAULT EQU 64
DISK_SIZE_MINIMUM EQU 16
DISK_SIZE_MAXIMUM EQU 32 * 1024
SECTOR_SIZE_DEFAULT EQU 256
SECTOR_SIZE_MINIMUM EQU 128
SECTOR_SIZE_MAXIMUM EQU 512
ROOT_ENTRIES_DEFAULT EQU 64
ROOT_ENTRIES_MINIMUM EQU 4
ROOT_ENTRIES_MAXIMUM EQU 512

DISK_SIZE_TEMP DW DISK_SIZE_DEFAULT
SECTOR_SIZE_TEMP DW SECTOR_SIZE_DEFAULT
ROOT_ENTRIES_TEMP DW ROOT_ENTRIES_DEFAULT
DISK_SIZE DW DISK_SIZE_DEFAULT
PARA_FLAG DB ?
READ_ONLY_FLAG DB 0
FORMAT_FLAG DB 1

BPB_ARRAY DW BIOS_PARAMETER_BLOCK

VOLUME_LABEL LABEL BYTE
DB "PCMGAG", SPACE, BOX, SPACE, "MM"
DB 28H
DT 0
DW 6000H ;Date July 1, 1988
DW 10E1H ;Time 12:00pm
DB 6 DUP (0)

VOLUME_LENGTH EQU $ - VOLUME_LABEL

PASSWORD DB "APC Productivity"
PASSWORD_LENGTH EQU $ - PASSWORD

DISK_SIZE_MSG DB CR,LF,"Disk Size",",0
SECTOR_SIZE_MSG DB "K",CR,LF,"Sector Size",",0
DIRECTORY_ENTRIES_MSG DB CR,LF,"Directory Entries",",0

MEDIA_NOT_CHANGED EQU 1
MEDIA_CHANGED EQU -1
TWELVE_BIT_FAT EQU 4087
ONE_K EQU 1024
SIXTEEN_K EQU 16384
THIRTY_TWO_K EQU 32768

INPUT_COMMAND EQU 4
COMMAND DB ?

FRAME_SEGMENT DW ?
HANDLE DW ?
PAGES DW ?

;-----;
; Character device functions; ignore and return no error code. ;
;-----;

INPUT_NOWAIT:
INPUT_STATUS:
INPUT_FLUSH:
OUTPUT_STATUS:
OUTPUT_FLUSH: XOR AX,AX ;Successful.
RET

;-----;
; Tell DOS media has changed if disk has been resized. ;
;-----;

MEDIA_CHECK PROC NEAR

MOV ES:RETURN_BYTE[DI],MEDIA_NOT_CHANGED
CMP FORMAT_FLAG,1
JNZ MEDIA_END
MOV ES:RETURN_BYTE[DI],MEDIA_CHANGED
MEDIA_END:
XOR AX,AX
RET

MEDIA_CHECK ENDP

```

continues . . .

*continues . . .*



# CHOOSE ANY 3 PROGRAMS FOR ONLY \$9.00

**Plus free membership to  
CHOICE MARKETING SOFTWARE CLUB**  
TELEPHONE (09) 459 8894 FACSIMILE (09) 481 0074

The following software will work only on IBM & Compatible personal computers.

**CM100 PowerMenu** — Dos Menu program with built-in file manager.

**CM101 Intelli-trieve** Weighted-retrieval for dBase III+.

**CM102 Ez-Form** — Create new forms or modify existing ones to suit your needs.

**CM103 Q-Modem** — Full feature communication program.

**CM104 PC-Prompt** — You will never forget the right format for entering Dos Commands again.

**CM105 PC-Desktteam** — Calculator, calendar, Dos util., notepad, etc.

**CM106 Word Processing for Kids** — A word processing program designed for kids.

**CM107 Origami** — Teaches you the Japanese art of paper folding.

**CM108 Arcade Games Collection** — An assortment of the finest 'arcade type' games including Scramble and Donkey Kong.

**CM109 ImagePrint** — Allows you to produce letter quality print on your Epson or compatible printer.

**CM110 ProComm** — Communication program that allows you to go to Dos without terminating.

**CM111 Sidewriter** — If your report won't fit into a page, print it sideways.

**CM112 PC Outline** — Resident outlining program.

**CM113 PC Style** — Writing analysis program.

**CM117 PC-Stock** — Plot stock analysis graphs on monitor or printer.

**CM119 Basic Games** — Various games in Basic including Bowling, Keno, Spacewar and more.

**CM120 Desktop Publisher** — Publishing program for newsletters or simple applications.

**CM121 LottoPro** — Helps analyse Lotto trends.

**CM122 Bookkeeper** — A complete financial tool for business and personal use where complex accounting software is not needed.

**CM123 Poker Anyone?** — Five card draw poker against the computer.

**CM124 Duke Language Toolkit** — Create foreign and other fonts for EGA.

**CM125 Record Collector** — Professional level music cataloguing program. You find song by title, artist, label, producer and many more.

**CM126 HDMIII** — Hard disk menu system up to 10 menus/10 selections.

**CM127 Lititgex** — For keeping track of legal research, evidence, etc.

**CM128 ABC Fun Keys** — For ages 2-5: learning alphabet keyboard.

**CM129 AnyWord** — Text file index retrieval system.

**CM130 PC-Flow** — A flow chart designing program.

**CM133 T.O.P.** — Over 40 procedures and functions for Turbo Pascal 4.

**CM134 Bradford** — Letter quality fonts for Epson MX and FX.

**CM135 Weight Control** — Assists you in diet with info about dieting, self test.

**CM136 Context & Snipix** — Superimpose graphics onto text for use in desktop publishing.

**CM137 Beginning Sound** — Helps pre-schoolers learn to read.

**CM139 Grab Plus** — Automatic envelope addressing utility and address database.

**CM140 Formgen** — Design forms for home and office.

**CM141 Trilogy** — Note storing and retrieving utilities for writers and others.

**CM142 Domino** — Play dominos against the computer.

**CM143 Styled** — Writing analysis program.

**CM144 Card Track** — Credit card statement analysis program.

**CM146 Manage** — Improve your management skills by answering questions on various management topics.

**CM147 Automenu** — Dos Menu Program.

**CM149 As Easy As** — Lotus 1-2-3 look-alike.

What our customers say:

*"Once again, compliments on the prompt execution of orders."* — M.M., Fremantle.

*"I would also like to pass on my thanks for what must be one of the best value software packages (service) to be found within the marketplace."* — M.A., Traralgon.

*"... am eagerly awaiting the July Software of the Month."* — D.D., Tamworth.

Choice Marketing Software Club's "Value for Money" package includes:

- 10 days Free Trial. You may examine the programs in your own home and, if not completely satisfied, return them within 10 days. Your membership will be cancelled and you will owe nothing.

- Free Membership. There are no annual membership renewal fees — as a member you need buy only 4 program diskettes at regular low club prices of \$10 during the coming year. You may resign any time thereafter or continue to enjoy club benefits as long as you wish.

- Free Newsletter. Every month you will receive the club newsletter PD SOFT which will cover the software selection of the month, reviews, and the latest sharewares and public domain programs as alternatives.

- Every month you will get a selection of the latest and the best programs automatically. Each month more than 500K of the best programs are compressed into our monthly selection. You need do nothing; they'll be shipped to you automatically. If you don't want a selection, or prefer an alternative, or no software at all, just fill out the convenient form always provided and return it to us by the date specified.

- Access to thousands of good quality software programs at the cost of \$10 per disk plus \$3 shipping and handling charges. The cost of \$10 covers duplication costs, advertising, upkeep of library, computer equipment, newsletter, staff wages and sales tax. Some of the software in the library is subject to additional registration fees payable to the author for regular usage of their program. It's a case of you pay the registration fees if you like it, if not you don't, but you may still keep the program.

Mail to:

**FREE POST A13  
CHOICE MARKETING SOFTWARE CLUB  
PO Box 648, Gosnells WA 6110**

**Yes!** Please accept my application for membership in the **Choice Marketing Software Club**. Send me the 3 programs whose numbers I have indicated in boxes below plus my **FREE** membership, for only \$9.00 (\$19.00 for 3 1/2" diskette) plus \$3.00 shipping and handling. I agree to the Club Plan as described in this ad. I will take 4 more programs at regular low Club prices in the coming year and may resign at any time thereafter.

I wish to receive the 3 selections marked in the boxes provided:

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Diskette Size: ☐ 5 1/4" ☐ 3 1/2"

NAME \_\_\_\_\_ (please print)

ADDRESS \_\_\_\_\_

SUBURB \_\_\_\_\_ STATE \_\_\_\_\_ POSTCODE \_\_\_\_\_

Enclosed please find my payment as follows: Cheque / Money Order / or please charge my Visa / Bankcard.

Card No. \_\_\_\_\_ Expiry Date: \_\_\_\_\_  
SIGNATURE \_\_\_\_\_  
(If under 18 parent must sign) \_\_\_\_\_

APC/14

# BUY YOUR UPGRADES DIRECT AND SAVE

## HARD DISK DRIVES

### SEAGATE

|                                                        |              |
|--------------------------------------------------------|--------------|
| 21 MB 5¼" Drive 65 MS                                  | \$409        |
| <b>21 MB 5¼" Drive 65 MS with Controller &amp; Kit</b> | <b>\$499</b> |
| 32 MB 5¼" Drive 65 MS                                  | \$435        |
| 32 MB 5¼" Drive 65 MS with Controller & Kit            | \$570        |
| 42 MB 5¼" Drive 40 MS                                  | \$655        |
| <b>42 MB 5¼" Drive 40 MS with Controller &amp; Kit</b> | <b>\$740</b> |
| 42 MB 5¼" Drive 28 MS                                  | \$790        |
| 42 MB 5¼" Drive 28 MS with Controller & Kit            | \$875        |
| 21 MB 3½" Drive 40 MS                                  | \$499        |
| 21 MB 3½" Drive 40 MS with Controller & Kit            | \$590        |
| 49 MB 3½" Drive 40 MS                                  | \$799        |
| 49 MB 3½" Drive 40 MS with Controller & Kit            | \$930        |

### NEC

|                                 |        |
|---------------------------------|--------|
| 20 MB 5¼" Drive                 | \$459  |
| 20 MB 5¼" with Controller & Kit | \$546  |
| 30 MB 5¼" with Controller & Kit | \$599  |
| 40 MB 5¼" Drive 40 MS           | \$799  |
| 85 MB 5¼" Drive 28 MS           | \$1610 |

### TOSHIBA

|                        |        |
|------------------------|--------|
| 42 MB 3½" Drive 25 MS  | \$999  |
| 105 MB 5¼" Drive 25 MS | \$1499 |

### HARD CARDS

|                                     |        |
|-------------------------------------|--------|
| 21 MB Disk 40 MS on a Card Complete | \$649  |
| 42 MB Disk 25 MS on a Card          | \$1149 |

## ADD ON CARDS

### DISK CONTROLLER CARDS

|                                                        |       |
|--------------------------------------------------------|-------|
| Hard Disk (2X) Controller 8 Bit PC/XT                  | \$151 |
| Hard Disk (2X) Controller 16 Bit AT                    | \$229 |
| Hard Disk (2X) & Floppy (4X) Controller 16 Bit AT      | \$291 |
| Hard Disk (2X) Controller — RLL 8 Bit PC/XT/AT         | \$172 |
| Hard Disk (2X) Controller — RLL 16 Bit AT              | \$249 |
| Hard Disk (2X) & Floppy (2X) Controller<br>8 Bit PC/XT | \$215 |
| Advance Universal Floppy (4X) Controller<br>PC/XT/AT   | \$102 |
| Floppy Disk Controller (4X) PC/XT                      | \$72  |
| 3.5" External Floppy Controller AT                     | \$99  |

### MULTI I/O CARDS

|                                                          |       |
|----------------------------------------------------------|-------|
| Clock/Calendar Card PC/XT                                | \$55  |
| Clock/Calendar/RS232 Port PC/XT                          | \$86  |
| Printer Port PC/XT                                       | \$46  |
| RS232 Port PC/XT                                         | \$72  |
| Multi Serial 4 X RS232 Ports PC/XT                       | \$153 |
| Multi Serial 4 X RS232 Ports AT                          | \$221 |
| RS232 Port, Printer Port PC/XT                           | \$80  |
| Printer, RS232 (2nd Optional), Clock,<br>Game Port PC/XT | \$102 |
| Printer, RS232 (2nd Optional) AT                         | \$102 |

### VIDEO CARDS

|                                                           |       |
|-----------------------------------------------------------|-------|
| Mono, Hercules Graphics, Printer Port PC/XT/AT            | \$117 |
| Colour Graphics, Printer Port PC/XT/AT                    | \$112 |
| Colour Graphics, Mono, Hercules,<br>Printer Port PC/XT/AT | \$168 |
| EGA, CGA, MGA, HGA, Multisync 80386 Only                  | \$259 |
| EGA, CGA, MGA, HGA, Multisync,<br>Double Scan PC/XT/AT    | \$409 |

### MEMORY EXPANSION CARDS

|                                                     |        |
|-----------------------------------------------------|--------|
| Memory Expansion 64-640K Zero K PC/XT               | \$59   |
| Memory Expansion 2MB EMS Compat. Zero K PC/XT       | \$142  |
| Memory Expansion 2MB EMS Compat. Zero K AT          | \$189  |
| Memory Expansion 128K Zero K AT                     | \$65   |
| Memory Expansion 1MB Zero K AT                      | \$80   |
| Memory Expansion with 2MB<br>100 NS Chips for 80386 | \$1816 |
| Memory Expansion with<br>8MB 1MB Chips for 80386    | \$3587 |

### PROCESSOR & MOTHER BOARDS

|                                                  |        |
|--------------------------------------------------|--------|
| 8088-CPU Board Turbo 4.77 & 10 MHZ Zero K        | \$189  |
| 8088-CPU Board Turbo 4.77 & 10 MHZ 640 K         | \$679  |
| 286-CPU Board, 0 Wait, 8 & 10 MHZ Zero K         | \$583  |
| 286-CPU Board, 1 MB Ram, 0 Wait, 8 & 10 MHZ      | \$1499 |
| 386-CPU Board, 2 MB Ram on Board, 0 Wait, 20 MHZ | \$4299 |

## DISKETTE DRIVES

|                                                     |       |                                            |       |
|-----------------------------------------------------|-------|--------------------------------------------|-------|
| NEC Diskette Drive 5.25" 1.2 MB (Reads/Writes 360K) | \$231 | Sony Diskette Drive 3.5" 1.44 MB           | \$310 |
| NEC Diskette Drive 3.5" 720 K                       | \$245 | Sony Diskette Drive 3.5" 1.44 MB. External | \$399 |
| NEC Diskette Drive 3.5" 720 K. External             | \$351 | TEAC Diskette Drive 5.25" 360 K            | \$180 |



**ADVANCE PERIPHERALS PTY LTD**  
 Suite 3, 846 Pacific Highway.  
 (P.O. Box 215) Gordon. N.S.W. 2072.  
Prices Quoted Include Sales Tax  
 Prices Are Subject To Change Without Notice

**TO ORDER PHONE**  
**(008) 25 1489**  
**FAX: (02) 498 2665**  
**IN SYDNEY CALL**  
**498 2411**

# BUY YOUR UPGRADES DIRECT AND SAVE

## DISKETTES — LIFETIME WARRANTY

### 5¼" DISKETTES

|                         |        |
|-------------------------|--------|
| — 1.0 Brand 2S 2D 360 K | \$0.99 |
| — BASF 1.2 MB           | \$3.50 |

### 3½" DISKETTES

|                           |        |
|---------------------------|--------|
| — Verbatim Datalife 720 K | \$3.60 |
| — BASF 1.44 MB            | \$7.50 |

### DATA CARTRIDGES

|                           |         |
|---------------------------|---------|
| — Verbatim DL2000 — 40 MB | \$41.00 |
|---------------------------|---------|

## PRINTERS

### ● BROTHER

|                               |        |
|-------------------------------|--------|
| M1109 80 Col. 100/25 9 Pin    | \$436  |
| M1709 132 Col. 240/50 9 Pin   | \$942  |
| M1724L 132 Col. 216/72 24 Pin | \$1297 |

### ● NEC

|                              |        |
|------------------------------|--------|
| P2200 80 Col. 140/60 24 Pin  | \$699  |
| P5200 88 Col. 265/95 24 Pin  | \$949  |
| P5300 186 Col. 265/95 24 Pin | \$1419 |

### ● OKI DATA

|                             |       |
|-----------------------------|-------|
| ML182 80 Col. 120/20 9 Pin  | \$397 |
| ML183 136 Col. 120/20 9 Pin | \$679 |
| ML193 136 Col. 240/40 9 Pin | \$817 |

## MONITORS

|                           |        |
|---------------------------|--------|
| NEC Multisync II 14"      | \$1150 |
| NEC Multisync 15" Hires   | Call   |
| NEC Multisync 20" Hires   | Call   |
| Intra Dual Scan 14" Amber | \$250  |
| CTX 14" Monitor           | \$205  |

## EXTERNAL DISKETTE DRIVES

### 3½" NEC 720 K DRIVE

|                                          |       |
|------------------------------------------|-------|
| Steel Case, 37 Pin Plug XT/AT Compatible |       |
| Must use DOS 3.2/3                       | \$351 |

### 5¼" for PS/2

|                                                                |       |
|----------------------------------------------------------------|-------|
| Model 25/30/50/60/80 — Allows PS/2 to Read and Write 5¼" Disks | \$349 |
|----------------------------------------------------------------|-------|

## RIBBONS

|                             |         |
|-----------------------------|---------|
| Brother M1009               | \$8.85  |
| Brother M1509               | \$15.60 |
| Epson EX800, EX1000, LQ2500 | \$14.10 |
| Epson LQ800                 | \$9.75  |
| Epson LQ1000                | \$10.80 |
| Epson LQ1500                | \$8.99  |
| Epson LX80                  | \$6.45  |
| Epson MX80                  | \$8.40  |
| Epson MX100                 | \$12.21 |
| Epson MX100 Refill Pack     | \$6.09  |
| NEC P3, P7                  | \$13.65 |
| NEC P5                      | \$12.21 |
| Citoh 8510                  | \$7.65  |
| Okidata M80                 | \$2.93  |
| Okidata M84                 | \$7.87  |
| Okidata ML182, ML183, ML193 | \$8.40  |
| Panasonic KXP110            | \$9.00  |
| Riteman 12                  | \$12.26 |
| Toshiba P1350               | \$10.80 |

## SUPER SYSTEM SPECIALS

### A. TURBO XT-8088 10 MHZ

640K RAM MEMORY  
360K FLOPPY DRIVE  
DISKETTE DRIVE CONTROLLER  
SERIAL PORT  
PRINTER PORT  
GAMES PORT  
CLOCK CALENDAR  
150W POWER SUPPLY  
KEYBOARD 101 KEYS  
MONO/HERCULES VIDEO CARD  
DR. DOS 3.3 + GW BASIC

**\$1,295**

WITH 20MG HARD DISK + CONTROLLER **ADD \$486**

WITH 30MG HARD DISK + CONTROLLER **ADD \$551**

WITH 40MG HARD DISK + CONTROLLER **ADD \$711**

WITH DUAL SCAN 14" MONITOR **ADD \$225**

### B. TURBO AT-286 12 MHZ

512K RAM MEMORY  
1.2MG FLOPPY DRIVE  
HARD DISK/FLOPPY CONTROLLER  
SERIAL PORT  
PRINTER PORT  
CLOCK CALENDAR  
200W POWER SUPPLY  
KEYBOARD 101 KEYS  
MONO/HERCULES VIDEO CARD  
DR. DOS 3.3 + GW BASIC

**\$1,875**

WITH 20MG HARD DISK **ADD \$398**

WITH 40MG HARD DISK **ADD \$622**

WITH DUAL SCAN 14" MONITOR **ADD \$225**

### C. AT-286 16 MHZ

**SAME AS B. BUT FASTER**

**\$2,545**

WITH 20MG HARD DISK **ADD \$398**

WITH 40MG HARD DISK **ADD \$622**

WITH DUAL SCAN 14" MONITOR **ADD \$225**

### D. 386 20 MHZ

2MG RAM MEMORY  
1.2MG FLOPPY DRIVE  
SERIAL PORT  
PRINTER PORT  
220W POWER SUPPLY  
TOWER CASE  
KEYBOARD 101 KEYS  
EGA VIDEO CARD  
NEC MULTISYNC II MONITOR

**CALL**

● **ALL HARD DISK DRIVES QUOTED ARE SEAGATE**

● **12 MONTHS WARRANTY ON ALL ITEMS**

● **CALL FOR OTHER CONFIGURATIONS**

## MOUSE

### GENIUS MOUSE

**\$119**

#### + Dr. Halo Software

- Super Tracking Speed
- Programmable Resolution
- Pop Up Menus
- Menu Maker
- Mouse Pad
- Mouse Pocket
- 3 Button serial

## POWER SUPPLIES

|               |       |
|---------------|-------|
| — 220 W AT    | \$240 |
| — 180 W AT/XT | \$185 |
| — 150 W PC/XT | \$135 |

## CASES

|                                      |       |
|--------------------------------------|-------|
| — AT/XT Floptop                      | \$109 |
| — AT Standard                        | \$147 |
| — Tower Case with 220 W Power Supply | \$749 |

## ACCESSORIES

|                                         |       |
|-----------------------------------------|-------|
| Keyboard 101 Keys                       |       |
| Switchable to PC/XT/AT                  | \$139 |
| Chassis to Fit 3½" Floppy into 5¼" Slot | \$30  |
| Micro Mover — Computer Desk             | \$399 |
| Printer Cable                           | \$29  |

## TAPE BACK-UP

Mountain Tape Back-up Drive  
Complete with Software + Manuals

|                      |       |
|----------------------|-------|
| TD4440 AT Compatible | \$960 |
| TD4340 XT Compatible | \$960 |

## MODEMS — EXTERNAL

|                                                               |       |
|---------------------------------------------------------------|-------|
| 300/1200 BPS Full Duplex<br>Hayes Compatible V21, V22         | \$287 |
| 300/1200/75 BPS Full Duplex<br>Hayes Compatible V21, V22, V23 | \$359 |

## Introducing ...

### Dr. Dos 3.3

Here are all the features you would expect from a Single-User Operating System — plus some more ...

- ★ Fully Executed from ROM
- ★ Password Protection of Directories
- ★ Multiple DOS Partitions up to 512 MB
- ★ Built-In Help Screens Describing Options
- ★ Runs DOS 1.X, 2.X & 3.X Applications
- ★ Complete Utility Set Compatible with DOS 3.X Utilities
- ★ International Keyboard Support

**\$159**



**ADVANCE PERIPHERALS PTY LTD**

Suite 3, 846 Pacific Highway.  
(P.O. Box 215) Gordon, N.S.W. 2072.

Prices Quoted Include Sales Tax  
Prices Are Subject To Change Without Notice

**TO ORDER PHONE**  
**(008) 25 1489**  
**FAX: (02) 498 2665**  
**IN SYDNEY CALL**  
**498 2411**



```

; When DOS has retrieved BPB, indicate media no longer changed.
BUILD_BPB PROC NEAR

```

```

    MOV     ES,BPB_OFFSET[DI],OFFSET BIOS_PARAMETER_BLOCK
    MOV     ES,BPB_SEGMENT[DI],CS
    MOV     FORMAT_FLAG,0
    XOR     AX,AX
    RET
BUILD_BPB ENDP

```

```

; Entry point for both DOS INPUT and OUTPUT. The direction
; the data is moved is determined by INPUT/OUTPUT command code.
INPUT_OUTPUT PROC NEAR

```

```

INPUT:
OUTPUT:
OUTPUT_VERIFY: MOV     AL,ES:COMMAND_CODE[DI]
                MOV     COMMAND,AL ;Save the DOS request.

```

```

; If you add this code, an asterisk will be
; displayed so you can observe every disk access.
; push ax
; mov al,"*"
; call write_tty
; pop ax

CMP     READ_ONLY_FLAG,1 ;Is this a write protect disk?
JNZ     CK_RANGE ;If no, go check range.
CMP     AL,INPUT_COMMAND ;Else, is this an write request?
MOV     AX,WRITE_PROTECT ;Assume yes: write violation.
JNZ     IO_ERROR ;If guessed right, exit.

```

```

CK_RANGE: MOV     CX,ES:BYTE_OR_SECTOR_COUNT[DI] ;Retrieve sector count.
          MOV     BP,ES:STARTING_SECTOR[DI] ;Retrieve starting sector
          MOV     BX,BP ;and save in BX.
          CMP     BP,TOTAL_SECTORS ;If starting sector greater
          MOV     AX,SECTOR_NOT_FOUND ;or equal to total sectors

          JAE     IO_ERROR ;then out of range.
          ADD     BX,CX ;if starting + count total
          CMP     BX,TOTAL_SECTORS ;then out of range.
          JBE     SAVE_PAGE_MAP

```

```

IO_ERROR: MOV     ES:BYTE_OR_SECTOR_COUNT[DI],0 ;No sectors moved.
          RET

```

```

SAVE_PAGE_MAP: MOV     DX,HANDLE ;Retrieve EMM handle.
                MOV     AH,47H ;Preserve current expanded
                INT     67H ;memory registers.
                OR     AH,AH ;Was there an error?
                MOV     AX,DEVICE_NOT_READY ;If yes, return error.
                JNZ     IO_ERROR

```

```

                PUSH     DS ;Preserve data segment.
                MOV     DX,BYTES_PER_SECTOR ;Retrieve bytes/sector.
                MOV     AX,ES:TRANSFER_SEGMENT[DI] ;Destination, transfer
                MOV     SI,ES:TRANSFER_OFFSET[DI] ;segment and offset.
                MOV     BX,FRAME_SEGMENT ;Source EMM segment.
                CMP     COMMAND,INPUT_COMMAND ;Is this a DOS read request?
                JNZ     SET_SEGMENTS ;If no, write: guessed right.
                XCHG     AX,BX ;Else, read request: swap
                MOV     DI,SI ;source and destination.

```

```

SET_SEGMENTS: MOV     DS,AX ;Set segments.
                MOV     ES,BX
                MOV     BX,-1 ;Initialize page out of range.

```

```

NEXT_SECTOR: PUSH     CX ;Save sector count.
                PUSH     DX ;Save bytes/sector.
                MOV     AX,BP ;Requested sector times
                MUL     DX ;bytes/sector = bytes offset.
                MOV     CX,SIXTEEN_K ;Divide by 16K: quotient = page
                DIV     CX ;remainder = offset.
                CMP     AX,BX ;Is request page currently in
                JZ      MOVE_SECTOR ;memory? if yes, continue.

```

```

                MOV     BX,AX ;Make requested current page.
                CMP     CS:COMMAND,INPUT_COMMAND ;Is it a read request?
                JNZ     OUTPUT_CODE ;If no, write request.
                MOV     SI,DX ;If read, SI = destination.
                JNP     SHORT MAP_PAGE

```

```

OUTPUT_CODE: MOV     DI,DX ;If write, DI = destination.
                XOR     AL,AL ;AL = physical page; BX = logical
                MOV     DX,CS:HANDLE ;DX = EMM handle.
                MOV     AH,44H ;Map the page into memory.
                INT     67H

```

```

MOVE_SECTOR: POP     DX ;Retrieve bytes/sector.
                MOV     CX,DX ;Save in counter.
                SHR     CX,1 ;Divide by two.
                REP     MOVSW ;Move CX words.
                INC     BP ;Next requested sector.
                POP     CX ;Retrieve sector count.
                LOOP    NEXT_SECTOR ;Do all requested sectors.

```

```

                POP     DS ;Restore data segment.
                MOV     DX,HANDLE ;EMM handle.
                MOV     AH,48H ;Restore Page Map.
                INT     67H
                XOR     AX,AX ;Return success code.
                RET

```

```

INPUT_OUTPUT ENDP

```

```

; Return password and parsing results to XPANBOSS.
IOCTL_INPUT PROC NEAR

```

```

    MOV     CX,PASSWORD_LENGTH ;Is password length same
    CMP     CX,ES:BYTE_OR_SECTOR_COUNT[DI] ;as byte count request?
    JZ      IOCTL_WRITE ;If yes, continue.
    MOV     ES:BYTE_OR_SECTOR_COUNT[DI],0 ;Else, zero transferred.
    MOV     AX,UNKNOWN_UNIT ;Unknown unit.
    JMP     SHORT IO_INPUT_END

```

```

IOCTL_WRITE: PUSH     DS ;Save segments and
                PUSH     ES ;and counter.
                PUSH     CX

                MOV     DS,ES:TRANSFER_SEGMENT[DI] ;Point to XPANBOSS's
                MOV     SI,SIH ;FSP command line.
                CALL     PARSE ;Parse the parameters.

                POP     CX ;Restore registers.

```

```

    POP     ES
    POP     DS

    MOV     SI,OFFSET PASSWORD ;Point to password.
    MOV     AX,ES:TRANSFER_OFFSET[DI] ;Destination, XPANBOSS
    MOV     ES,ES:TRANSFER_SEGMENT[DI] ;communication pipe.
    MOV     DI,AX
    REP     MOVSB ;Transfer the password.

    MOV     AL,PARAM_FLAG ;Parameter found?
    AND     AX,BP ;WITHOUT confirmation flag.
    STOSB ;Return 1 if should prompt user.

```

```

    XOR     AX,AX ;Successful.
    RET

```

```

IOCTL_INPUT ENDP

```

```

; If counter password confirms, then XPANBOSS OK'ed disk parameter changes.
IOCTL_OUTPUT PROC NEAR

```

```

    MOV     CX,PASSWORD_LENGTH ;Is password length same
    CMP     CX,ES:BYTE_OR_SECTOR_COUNT[DI] ;as byte count request?
    JNZ     IOCTL_ERROR ;If no, not XPANBOSS.

```

```

    PUSH     ES ;Save request header
    PUSH     DI ;pointers.
    MOV     SI,OFFSET PASSWORD ;Check if counter
    MOV     AX,ES:TRANSFER_OFFSET[DI] ;password confirms.
    MOV     ES,ES:TRANSFER_SEGMENT[DI]
    MOV     DI,AX
    REPZ    CMPSB
    POP     DI
    POP     ES ;Restore registers.
    JNZ     IOCTL_ERROR ;If bad password, exit.

```

```

    CMP     PARA_FLAG,1 ;Any parameters?
    JNZ     IOCTL_DONE ;If no, our task done.

    MOV     DX,HANDLE ;Retrieve EMM handle.
    MOV     AH,45H ;Deallocate Pages.
    INT     67H
    CALL     ALLOCATE ;Allocate new pages.
    JC      IOCTL_ERROR ;Error exit if failed.

```

```

IOCTL_DONE: CALL     STATISTICS ;Else, display stats.
                XOR     AX,AX ;Return successful.
                JMP     SHORT IO_OUTPUT_END

```

```

IOCTL_ERROR: MOV     ES:BYTE_OR_SECTOR_COUNT[DI],0 ;Else, zero transferred.
                MOV     AX,UNKNOWN_UNIT ;Unknown unit.

```

```

IO_OUTPUT_END: RET

```

```

IOCTL_OUTPUT ENDP

```

```

; INPUT - DS:SI Points to parameters.
;-----
PARSE PROC NEAR

```

```

    PUSH     CS ;Point ES to local data.
    POP     ES
    MOV     ES:PARAM_FLAG,0 ;Initialize variables.
    MOV     ES:READ_ONLY_FLAG,0
    MOV     ES:DISK_SIZE_TEMP,DISK_SIZE_DEFAULT
    MOV     ES:SECTOR_SIZE_TEMP,SECTOR_SIZE_DEFAULT
    MOV     ES:ROOT_ENTRIES_TEMP,ROOT_ENTRIES_DEFAULT
    MOV     BP,1 ;WITHOUT asking flag; assume yes.

```

```

NEXT_PARSE: LODSB ;Get a byte.
                CMP     AL,CR ;If carriage return
                JZ      PARSE_END ;or linefeed, done.
                CMP     AL,LF
                JZ      PARSE_END
                CMP     AL,?
                JNZ     NEXT_PARSE ;Switch character?
                CMP     AL,SFH ;If no, next byte.
                JZ      PARSE_END ;Else, get switch.
                CMP     AL,CR ;If CR or LF, done.
                JZ      PARSE_END
                AND     AL,"M" ;Else, capitalize
                JZ      PARSE_END ;Is it Minimum?
                CMP     AX,CK_A
                MOV     ES:DISK_SIZE_TEMP,DISK_SIZE_MINIMUM
                JMP     SHORT PARA_CHANGED

```

```

PARSE_END: RET

CK_A: CMP     AL,"A" ;Is it Maximum?
        JNZ     CK_R
        MOV     ES:DISK_SIZE_TEMP,DISK_SIZE_MAXIMUM
        JMP     SHORT PARA_CHANGED

```

```

CK_R: CMP     AL,"R" ;Is it Read-only?
        JNZ     CK_W
        MOV     ES:READ_ONLY_FLAG,1

```

```

CK_W: CMP     AL,"W" ;Is it WITHOUT asking?
        JNZ     CK_PARA
        XOR     BP,BP ;WITHOUT confirmation flag.

```

```

CK_PARA: CALL     DECIMAL_INPUT ;Get decimal number.

```

```

                CMP     AL,"D" ;Is switch character Disk Size?
                JNZ     CK_S
                CMP     BX,DISK_SIZE_MINIMUM
                JAE     CK_D_MAX ;If yes, check boundaries.

```

```

CK_D_MAX: MOV     BX,DISK_SIZE_MINIMUM
                MOV     BX,DISK_SIZE_MAXIMUM
                JBE     STORE_D_TEMP
                MOV     BX,DISK_SIZE_MAXIMUM
                MOV     ES:DISK_SIZE_TEMP,BX
                JMP     SHORT PARA_CHANGED

```

```

CK_S: CMP     AL,"S" ;Is it Sector Size?
        JNZ     CK_E
        MOV     CX,SECTOR_SIZE_MINIMUM ;If yes, check boundaries
        CMP     BX,CX
        JBE     STORE_S_TEMP
        MOV     CX,SECTOR_SIZE_MAXIMUM
        CMP     BX,CX
        JAE     STORE_S_TEMP
        MOV     CX,SECTOR_SIZE_DEFAULT
        MOV     ES:SECTOR_SIZE_TEMP,CX

```

continues...

# **COMPUTER CAPITOL** PTY. LTD.

1ST FLOOR, 533 WILLOUGHBY ROAD WILLOUGHBY 2068

PHONE: (02) 958 7977

**Quattro**  
**\$250**

**Sidekick  
Plus**  
**\$250**

**Ultra 30MB  
Mono Screen**  
**\$1920**

**Qume Laser  
10PPM Demo  
Model (1 only)**  
**\$2500**

**Colorado 44MB  
Tape Backup**  
Internal \$600  
External \$750

**Brother  
HR40  
Daisywheel**  
**\$1050**

**Brother  
M1209  
168cps**  
**\$450**

**Caralier 40MB  
AT Mono  
Screen**  
**\$2400**

**Wyse XT  
30MB Mono**  
**\$2200**

**MD11  
Multisync  
Monitor**  
**\$750**

**Wyse AT  
30MB Mono**  
**\$3100**

**Compaq 386/20  
70MB, 2MB  
Mono - Demo -  
Unit**  
**\$7500**

**Modems  
Blitzer**  
12E \$300  
123E \$350

**Hercules In  
colour Card**  
**\$450**

**Data Products  
LZR 2630 26  
PPM Laser Demo  
Model**  
**\$13000**

**Paradox  
Call**

**Toshiba  
P1340  
(Demo)**  
**\$550**

**XT Clone  
20MB Mono  
Screen**  
**\$1628**

**Genicom  
3410**  
**\$2900**

**Houston Plotters**  
52MP (Demo) \$5200  
60/61 \$8000  
695 \$680  
52 \$5200

**Toshiba  
T3200  
(Demo)**  
**\$6200**

**Genius  
Mouse**  
**\$120**

**Miniscribe  
20MB with  
Controller**  
**\$440**

**Monitors  
12" Mono**  
**\$165**

**Qume Sprint  
11/55  
Daisywheel  
Demo**  
**\$1000**

**Le Floppie  
Diskettes**  
**\$8.20**

**OKI  
ML390**  
**\$950**

**OKI ML**  
**182**  
**\$400**

# PRODUCTIVITY

```

        JMP     SHORT PARA_CHANGED

CK_E:    CMP     AL,"E"                ;Is it Root Directory Entries?
        JNZ     PARA_END
        CMP     BX,ROOT_ENTRIES_MINIMUM ;If yes, check boundaries
        JAE     CK_E_MAX
        MOV     BX,ROOT_ENTRIES_MINIMUM
        CMP     BX,ROOT_ENTRIES_MAXIMUM
        JBE     STORE_E_TEMP
        MOV     ES:ROOT_ENTRIES_TEMP,BX
        MOV     STORE_E_TEMP:

PARA_CHANGED: OR     ES:PARA_FLAG,1    ;Flag that parameter found.
PARA_END:    JMP     NEXT_PARSE        ;Parse all parameters.

PARSE     ENDP

;-----
; INPUT - SI points to parameter start.
; OUTPUT - SI points to parameter end. BX = number.
;-----
DECIMAL_INPUT PROC NEAR
        PUSH    AX                    ;Save switch character.
        XOR     BX,BX                ;Start with zero as number.
        LODSB
        AL,CR                        ;Carriage return or linefeed?
        JZ      ADJUST_DEC           ;If yes, done here.
        CMP     AL,LF
        JZ      ADJUST_DEC
        CMP     AL,"/"
        JZ      ADJUST_DEC           ;Forward slash?
        SUB     AL,"0"
        JC      NEXT_DECIMAL         ;If not between 0 and 9, skip.
        CMP     AL,9
        JA      NEXT_DECIMAL
        CBW
        XCHG    AX,BX                ;Convert byte to word.
        MOV     CX,10                ;Swap old and new number.
        MUL     CX,10                ;Shift to left by multiplying
        JC      DECIMAL_ERROR        ;last entry by ten.
        ADD     BX,AX
        JNC     NEXT_DECIMAL         ;If carry, too big.
        MOV     BX,-1                ;Else, too big; return -1.
        DECIMAL_ERROR: MOV     BX,-1
        ADJUST_DEC: DEC     SI        ;Adjust pointer.
        POP     AX                    ;Restore switch character.
        RET
DECIMAL_INPUT ENDP

;-----
; OUTPUT - CY = 0 If successful. CY = 1 If unsuccessful.
;-----
ALLOCATE PROC NEAR
        PUSH    ES                    ;Save request header pointers.
        PUSH    DI
        MOV     BX,DISK_SIZE_TEMP    ;Retrieve disk size request.
        ADD     BX,15+16              ;Round up and adjust for DEC.
        MOV     CL,4
        SHR     BX,CL                ;Convert to number of 16K pages.
        NEXT_ALLOCATE: DEC     BX
        JNZ     GET_MEMORY            ;Decrement page request until
        STC                                     ;filled with memory available.
        JMP     ALLOCATE_END          ;Error if no memory available.
        GET_MEMORY: MOV     AH,43H    ;Allocate Pages.
        INT     67H
        OR      AH,AH
        JNZ     NEXT_ALLOCATE        ;Successful?
        MOV     PAGES,BX             ;If no, decrement by one page.
        MOV     HANDLE,DX
        SHL     BX,CL                ;Convert back to K bytes.
        MOV     DISK_SIZE,BX        ;Store size of disk for stats.
        NEXT_SECTORS: MOV     BP,SECTOR_SIZE_TEMP ;Retrieve sector size request.
        MUL     AX,ONE_K              ;Disk size * 1024 / sector size
        SUB     AX,BP                ;= total sectors. Total sectors
        SBB     DX,0                 ;cannot exceed 64K. Adjust
        CMP     DX,BP                ;sector size up until total
        JB      GOT_SECTORS          ;sectors 64K.
        SHL     BP,1                 ;(Decrement by one sector to
        JMP     SHORT NEXT_SECTORS    ;make division by zero easy
        ; to detect and avoid.)
        GOT_SECTORS: DIV     BP       ;Divide to get total sectors - 1.
        INC     AX                    ;Increment to get total sectors.
        OR      AX,AX
        JNZ     SECTORS              ;Can't have 65536 (64K) sectors.
        DEC     AX                    ;That is, sector total is not
        ; a zero based number.
        SECTORS: MOV     TOTAL_SECTORS,AX ;Store sector count.
        PUSH    AX                    ;Save results.
        MOV     BYTES_PER_SECTOR,BP   ;Store bytes/sector.
        MOV     DX,BP                ;Retrieve sector size.
        MOV     CL,5
        SHR     DX,CL                ;Divide by 32 = entries/sector.
        MOV     AX,ROOT_ENTRIES_TEMP ;Retrieve entries requested.
        DIV     DL                    ;Divide by entries/sector.
        ADD     AH,-1                ;Round if remainder.
        ADC     AL,0
        XOR     AH,AH                ;Zero in high half.
        MOV     BX,AX                ;Save directory sectors.
        DL      DL                    ;Times entries/sector
        MOV     ROOT_DIRECTORY_ENTRIES,AX ; = total directory entries.
        POP     AX
        MOV     CL,1                 ;Retrieve total sectors.
        CMP     AX,THIRTY_TWO_K - 2 ;Assume 1 sector/cluster.
        JB      STORE_RESULTS        ;If total over half of maximum.
        INC     CL                    ;If yes, assumed right.
        MOV     SECTORS_PER_CLUSTER,CL ;Store sectors/cluster.
        STORE_RESULTS: MOV     AX,BX
        SUB     AX,BX                ;Subtract directory sectors
        DEC     AX                    ;Subtract boot sector
        SHR     CL,1                 ;Divide cluster size by 2.
        SHR     AX,CL                ;Divide to get clusters.
        MOV     CX,AX                ;Save clusters in CX.
        SHL     AX,1                 ;Clusters * 2 = 16 bit FAT bytes.
        MOV     BL,0FFH              ;0FFh as 3rd byte in 16 bit FAT.
        CMP     CX,TWELVE_BIT_FAT    ;If clusters 4087, 16 bit FAT.
        JA      GOT_FAT              ;Else, 1.5 bytes per 12 bit FATs.
        ADD     AX,CX

```

```

        INC     AX,1                 ;Round up.
        SHR     BL,BL                ;Use zero as 3rd byte in FAT.
        GOT_FAT: XOR     DX,DX        ;Zero in high half.
        DIV     BP                    ;Divide by bytes/sector.
        ADD     DX,-1                ;Round up.
        MOV     SECTORS_PER_FAT,AX   ;Store sectors/FAT.
        CALL    FORMAT               ;Format the disk.
        CLC                                     ;CY = 0 for success.
        ALLOCATE_END: POP     DI
        POP     ES                    ;Restore request header pointers.
        ALLOCATE ENDP

;-----
; INPUT - BL = 00h for 12 bit fat. BL = FFh for 16 bit fat.
;-----
FORMAT PROC NEAR
        PUSH    BX                    ;Save BX.
        MOV     DX,HANDLE            ;Retrieve EMM handle.
        MOV     CX,PAGES             ;Retrieve pages.
        CMP     CX,3                 ;Maximum for boot, FAT, and
        JBE     NEXT_MAP_PAGE        ;directory = 3 * 16K pages.
        MOV     CX,3
        MOV     AX,CX
        DEC     AX
        MOV     BX,AX
        MOV     AH,44H
        INT     67H
        LOOP    NEXT_MAP_PAGE        ;Physical page.
        ;Pages are zero based.
        ;Logical page the same.
        ;Map Handle Page.
        MOV     NEXT_MAP_PAGE
        MOV     AX,FRAME_SEGMENT     ;Map all necessary pages.
        MOV     ES,AX
        MOV     DI,DI
        MOV     SI,OFFSET BOOT_RECORD ;Retrieve frame segment.
        MOV     CX,BOOT_RECORD_LENGTH / 2 ;Store boot record
        REP     MOVSW                ; in sector zero.
        MOV     DI,BYTES_PER_SECTOR ;Retrieve bytes/sector; sector 1.
        MOV     AX,SECTORS_PER_FAT ;Retrieve sectors/FAT.
        MUL     DI                    ;Multiply to get total bytes.
        MOV     CX,AX
        MOV     AL,MEDIA_DESCRIPTOR ;Store media descriptor
        STOSB                        ; as first FAT byte.
        MOV     AX,0FFFFH            ;0FFFFh next two bytes of FAT.
        STOSW
        POP     BX
        MOV     AL,BL
        STOSB
        SUB     CX,4
        SHR     CX,1
        XOR     AX,AX
        REP     STOSW
        MOV     SI,OFFSET VOLUME_LABEL ;DI now points to directory.
        MOV     CX,VOLUME_LENGTH / 2 ;Store volume label as first
        REP     MOVSW                ; entry in directory.
        MOV     BX,ROOT_DIRECTORY_ENTRIES ;Retrieve directory entries.
        DEC     BX
        MOV     CL,4
        SHL     BX,CL                ;Less one for volume entry.
        MOV     CX,BX
        REP     STOSW                ;Times 32 / 2 bytes per word.
        MOV     FORMAT_FLAG,1        ;Zeros in directory.
        RET
        FORMAT ENDP

;-----
; Display disk size, sector size, and directory entries.
;-----
STATISTICS: MOV     SI,OFFSET DISK_SIZE_MSG
        CALL    TTY_STRING
        MOV     AX,DISK_SIZE
        CALL    DECIMAL_OUTPUT
        MOV     SI,OFFSET SECTOR_SIZE_MSG
        CALL    TTY_STRING
        MOV     AX,BYTES_PER_SECTOR
        CALL    DECIMAL_OUTPUT
        MOV     SI,OFFSET DIRECTORY_ENTRIES_MSG
        CALL    TTY_STRING
        MOV     AX,ROOT_DIRECTORY_ENTRIES
        CALL    DECIMAL_OUTPUT
        RET

TTY: CALL    WRITE_TTY
TTY_STRING: LODSB
        OR      AL,AL
        JNZ     TTY
        RET

WRITE_TTY: MOV     AH,0EH
        INT     10H
        RET

PRINT_STRING: MOV     AH,9
        INT     21H
        RET

;-----
; INPUT: AX = number.
;-----
DECIMAL_OUTPUT PROC NEAR
        MOV     BX,10
        XOR     CX,CX
        XOR     DX,DX
        DIV     BX
        ADD     DL,"0"
        PUSH    DX
        INC     CX
        CMP     AX,0
        JNZ     NEXT_COUNT
        MOV     NEXT_COUNT
        MOV     BX,CX
        MOV     AX,BX
        CALL    WRITE_TTY
        LOOP    NEXT_NUMBER
        RET
NEXT_COUNT:
NEXT_NUMBER:

```

continues . . .



# MOUSE CLEANER 360°

## GET YOUR MOUSE SQUEAKY CLEAN IN SECONDS

Your Computer Mouse needs regular cleaning to remove the build-up of dirt, lint and other residue on the tracking roller, and to keep it operating at peak performance. Built-up grime makes the cursor jump and jerk across the screen frustrating the operator and reducing productivity.

Mouse Cleaner 360 uses a totally new concept to quickly clean your mouse and keep it operating like new. Simply remove the existing ball from your mouse and replace it with MC360's patented Scrubber Ball. With a few circular motions of your hand, hundreds of tiny scrubbers go to work to whisk away built-up grime, dirt and other residue interfering with your Mouses's operation.

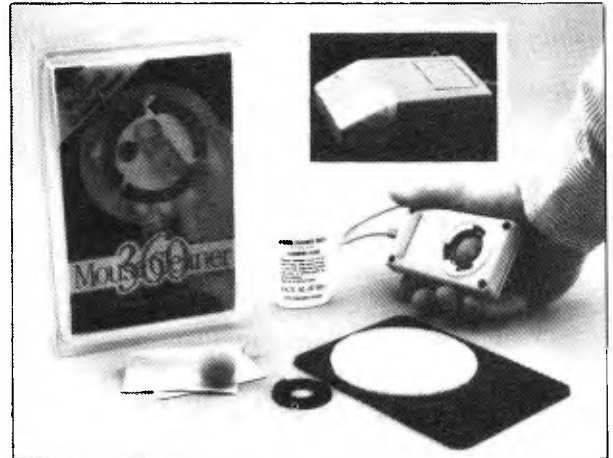
**Only \$40.00 each**  
(inc tax & postage)

**Part #72000** Apple, Iic, Iie, Iigs, Lisa, Macintosh, Microsoft Mouse, Atari 520 and 1040ST, Amiga 1000, and other mice using a 1" (2.5 cm) positioning ball.

**Part #72020** For use with Digital, AT&T, Hewlett Packard, Amiga 2000 and other mice using a 7/8" (2.2 cm) positioning ball.



P.O. Box 374  
Turrumurra NSW 2074  
Phone: (02) 449 4721  
Fax: (02) 488 9285



P.C. Accessories Pty Ltd. P.O. Box 374, Turrumurra NSW 2074

Please supply \_\_\_\_\_ Mouse Cleaner Kit #72000 (1" ball)  
\_\_\_\_\_ Mouse Cleaner Kit #72020 (7/8" ball)

Mr/Mrs/Ms \_\_\_\_\_

Address: \_\_\_\_\_

Bank/Master Card: \_\_\_\_\_

Expiry Date: \_\_\_\_\_ Signature: \_\_\_\_\_

# THE TA TEMPLATE SERIES

## TEMPLATES AVAILABLE

Lotus 123 1.1/2.0

Wordperfect 4.1/4.2/5.0

Microsoft Word 3.0/4.0

Displaywrite 3/4

Multimate 3.3/3.6

Multimate Adv II

Wordstar 2000+

Dbase III Plus

Symphony

Turbo Pascal

DOS

BLANK - Make your own

The surface of each template shows the complete menu structure of the program. It may also include page number references to the mini-manual, cursor control information, etc.

Each Template is made of high-impact moulded polystyrene.

The mini-manual is a specially condensed guide to your software. The function keys are directly referenced. Colours are used to indicate if a key is to be used in conjunction with Alt, Ctrl or Shift.

**PC-STYLE**

**EK-STYLE**



P.O. Box 374, Turrumurra NSW 2074  
Phone: (02) 449 4721 Fax: (02) 488 9285

For further information please return this coupon to:  
P.C. Accessories Pty Ltd, P.O. Box 374, Turrumurra NSW 2074

Mr/Mrs/Ms \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_

(Optional)

DECIMAL\_OUTPUT ENDP

EVEN

MAX\_RESIDENT EQU \$

\*\*\*\*\* END OF RESIDENT PORTION \*\*\*\*\*

HEADING LABEL BYTE  
COPYRIGHT DB CR,LF,"XPANDISK.SYS 1.0 (C) 1988 Ziff Communications Co."  
PROGRAMMER DB CR,LF,"APC Magazine",BOX," Michael J. Mefford",CR,LF,LF

DB "Syntax: XPANDISK.SYS [/D disk size] [/S sector size] [/E entries] [/M] [/A]"  
DB CR,LF,LF  
DB "disk size = (16 - 32768)K bytes; default = 64",CR,LF  
DB "sector size = (128,256,512) bytes; default = 256",CR,LF  
DB "entries = (4 - 512) in root directory; default = 64",CR,LF  
DB "M = Minimum disk size (16K)",CR,LF  
DB "A = All of available expanded memory",CR,LF,LF

DB "Use XPANBOSS.COM to control installed XPANDISK",CR,LF,LF,"\$"

EMM\_LENGTH DB "E0000000"  
EMM\_LENGTH EQU \$ - EMM  
EMM\_NOT\_FOUND DB CR,LF,"Expanded memory driver not found",CR,LF,LF,"\$"  
INSTALLED DB CR,LF,LF,"XPANDISK installed",CR,LF,LF,"\$"

-----  
; INPUT - ES:DI points to request header.  
; OUTPUT - AX = Error status  
-----

INIT PROC NEAR

MOV DX,OFFSET HEADING ;Display copyright.  
CALL PRINT\_STRING

PUSH DS ;Save segment registers.

PUSH ES  
MOV SI,ES:ARGUMENTS\_OR\_ARRAY\_OFF[DI] ;Point to CONFIG.SYS  
MOV DI,ES:ARGUMENTS\_OR\_ARRAY\_SEG[DI] ;XPANDISK parameters.

PARSE\_LEADING: LODSB ;Parse of any leading

CMP AL,SPACE ; white space after DEVICE =.

JBE PARSE\_LEADING

FIND\_END: LODSB ;Find end of "XPANDISK.SYS".

CMP AL,SPACE

JA FIND\_END

DEC SI

CALL PARSE ;Parse parameters.

POP ES ;Restore segment registers.

POP DS

MOV ES:UNITS[DI],1 ;Set up header.  
MOV ES:ARGUMENTS\_OR\_ARRAY\_OFF[DI],OFFSET BPB\_ARRAY  
MOV ES:ARGUMENTS\_OR\_ARRAY\_SEG[DI],CS  
  
PUSH ES ;Save request header pointers.  
PUSH DI  
MOV AX,3567H ;Retrieve EMM interrupt vector.  
INT 21H  
MOV DI,0AH ;See if offset 10 of vector  
MOV SI,OFFSET EMM ; points to E0000000.  
MOV CX,EMM\_LENGTH  
REPZ CMPSB  
POP DI ;Restore segments.  
POP ES  
JNZ NO\_EMM ;Exit if EMM not found.  
  
MOV AH,40H ;Get Status of EMM.  
INT 67H  
OR AH,AH  
JNZ NO\_EMM ;Exit if not working.  
  
MOV AH,41H ;Get Page Frame Address.  
INT 67H  
OR AH,AH  
JNZ NO\_EMM ;Exit if not available.  
MOV FRAME\_SEGMENT,BX ;Else, store.  
  
CALL ALLOCATE ;Allocate memory and format disk.  
JNC FOUND\_EMM ;Exit with error if failed.

NO\_EMM: MOV ES:ENDING\_OFFSET[DI],OFFSET MIN\_RESIDENT  
MOV ES:ENDING\_SEGMENT[DI],CS  
MOV ES:UNITS[DI],0 ;Install zero units.  
MOV EMM\_FLAG,0 ;Fall any other driver calls.  
MOV DX,OFFSET EMM\_NOT\_FOUND ;Tell user not installed.  
JMP SHORT INIT\_END

FOUND\_EMM: MOV ES:ENDING\_OFFSET[DI],OFFSET MAX\_RESIDENT  
MOV ES:ENDING\_SEGMENT[DI],CS  
CALL STATISTICS ;If successful installation  
MOV DX,OFFSET INSTALLED ; display stats and "installed".

INIT\_END: CALL PRINT\_STRING  
XOR AX,AX  
RET

INIT ENDP

\_TEXT ENDS

END

end

formatted 5.25in disk with a stamped, self-addressed package to Jean Lowers, APC, 124 Castlereagh Street, Sydney 2000. The assembly language listings for both programs are listed here and are also available on Microtex, as are Basic programs that will create the .SYS and .COM files when run once in Basic.

While the device driver name will vary slightly, depending on which manufacturer's expanded memory board you have, the statement

## DEVICE=EMM.SYS

must appear in your CONFIG.SYS file before you add the statement that loads XPANDISK. Except for this restriction, XPANDISK.SYS is installed like any other device driver — by adding a device statement to your CONFIG.SYS file. The syntax for XPANDISK is

DEVICE=[path] XPANDISK.SYS  
[/D] [/S] [/E] [/M] [/A]

entered on a single line. (Don't forget the .SYS extension. Unlike the DOS command line, which will search for executable programs if you omit the extension, without the .SYS extension XPANDISK will not be found and, therefore, not be installed.) Use the prefacing path option if you choose to store the driver somewhere else so as not to clutter up the root directory. If none of the optional parameters is supplied, XPANDISK defaults to a 64k drive with a sector size

of 256 bytes and room for 64 root directory entries.

To change the disk size, add the /D switch, followed by a disk size between the minimum of 16k and a maximum of 32,768k. A page (16k) is the smallest amount of expanded memory that can be allocated, and 32,768k (32Mbytes) is the maximum that can be managed by the LIM 4.0 Expanded Memory Manager.

*'Without the use of passwords as security, an application that also used IOCTL could blindly trigger a false and disastrous XPANDISK resizing.'*

The requested disk size will be rounded up to a multiple of the 16k page allotments. If the request is greater than the available memory, the virtual disk will be installed to the maximum available. The disk size includes the boot sector, FAT and root directory so the actual room for data will be slightly less than requested.

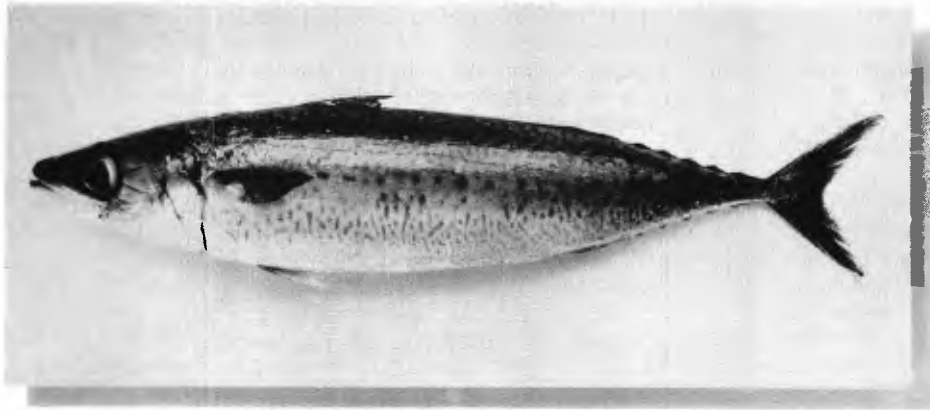
DOS allocates disk space for files in collections of sectors known as clusters. A cluster is the smallest unit of disk space that can be used for files. Since disk head movement is not a factor here, XPANDISK uses a single sector per

cluster. This means that the cluster size determines the economy of the disk. The sector size, specified by the /S switch, may be 128, 256 or 512 bytes. Use a smaller sector size if you have a lot of small files; otherwise, use the largest sector size, as this will require fewer sector accesses for reads and writes and will result in slightly faster performance.

For very large disks, XPANDISK will increase the sector size to conform to the maximum of 65,535 clusters on a disk. Because of this total cluster restriction (which is one less than the actual number of sectors necessary for a 32Mbyte disk), XPANDISK must use two sectors per cluster for RAMdisks larger than 16Mbytes.

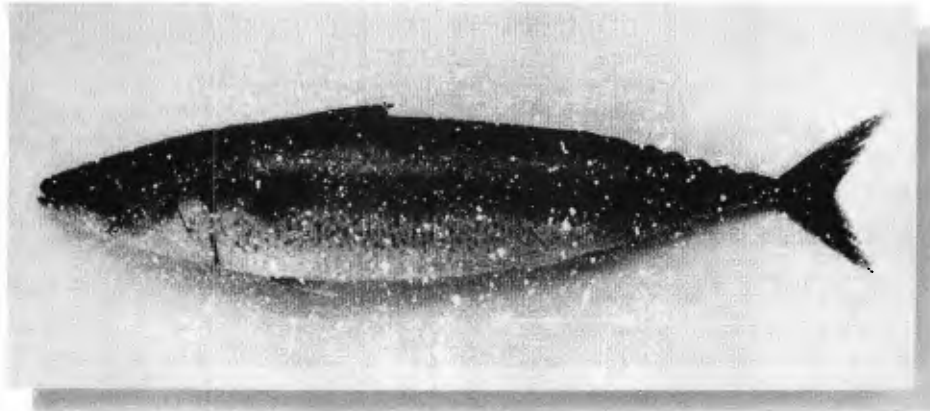
The /E parameter sets the number of entries available in XPANDISK's root directory. Acceptable values are between four and 512, and each directory entry consumes 32 bytes of disk space. XPANDISK will automatically round up the requested directory entries to the nearest sector boundary. Choose a file limit that will best utilise the directory structure you plan to use. For example, if the root will contain only a few subdirectories or files with most of the files maintained in subdirectories — the recommended structure — reduce the number of root directory entries. On the other hand, if you will be keeping a lot of files in the root, increase the entry number to avoid the ambiguous DOS File Creation Error message caused by a full root

# MACKEREL



(This image was scanned with a Skyscan D-120.)

# HOLEY MACKEREL



(This image wasn't.)

There is something decidedly fishy about most computer scanners.

The image you end up with on the screen never seems as clear as the one you scanned. Leaving holes where there should be dots.

Not so with the Skyscan D-120. It's the only hand-held scanner with two rollers instead of one. And a half tone mode which allows you to scan colour images at 16 levels of grey.

Making it much easier to catch fish (or any other image for that matter).

Not only is the Skyscan D-120 good for pictures, it's pretty good with words as well. Its

lower drop-out rate means that your documents won't come out looking like this.

And with its OCR capabilities, you'll be able to re-set and edit scanned text with your own word processing programme.

Whether it be Wordstar 2000, Word Perfect or Microsoft Word.

Which brings us to compatibility. Skyscan can handle most major programmes.

From desktop publishers like Pagemaker or Ventura, to graphics packages like Dr Halo and PC Paintbrush, and even Database programmes such as dBASE III.

Surprisingly, the Skyscan D-120 is one little box that won't cost you a bomb.

At around \$799, it's about five times less than most desktop scanners.

And even though it can scan half an A4 page at a time, it takes up much less space than a desktop. Which means you can put your feet up in front of your IBM PC (or compatible) and enjoy the picture.

The Skyscan D-120 hand-held scanner is available only through IPL-Datron.

So give us a call and see what our chips can do for your fish.



directory. Note that if XPANDISK is given a volume label, this will use one of the available root directory entries.

The /M parameter automatically minimises the disk size to 16k. You use this option to shrink the disk and release the rest of its expanded memory to those big applications. The /A parameter does just the opposite of /M, claiming all available expanded memory for the drive.

Although it must not be confused with DOS's VDISK program (which uses conventional and extended, but not expanded, memory), XPANDISK will accept command-line comments comparable to those you use with VDISK.

For example, to remind you of the meaning of the parameters, your CONFIG.SYS file might have (on a single line)

```
DEVICE=XPANDISK.SYS /disk
size = 120k /sector size
= 128 bytes
```

This would be the equivalent of the abbreviated

```
DEVICE=XPANDISK.SYS
/D120/S128
```

Note that the /D and /S parameters

(which need not be capitalised), followed by a numeric value, are all that XPANDISK is interested in. Everything else, including k after 128, is ignored. Assuming the memory is available, the above command would create a disk of 128k (120k rounded up to a multiple of 16k), with a sector size of 128 bytes and the default of 64 entries in the root directory.

The drive letter DOS assigns to XPANDISK will be the first available when it is installed. If you are currently using a SUBST drive, make sure it does not conflict with XPANDISK's added drive letter. You can install more than one XPANDISK drive just by adding another DEVICE=XPANDISK.SYS statement to the CONFIG.SYS file. Each driver consumes approximately 1200 bytes of conventional memory. XPANDISK will work with EMM 3.0 and DOS 2.0 and later.

## Using XPANBOSS

XPANBOSS is a normal .COM file that uses the DOS I/O control service to communicate with XPANDISK. With XPANBOSS you can change the configuration of the XPANDISK virtual drive any time you're at the DOS prompt. The syntax for XPANBOSS (which must be entered on a single line) is

```
XPANBOSS [d:] [/D disk size]
[/S sector size] [/E entries]
[/W] [/R] [/M] [/A]
```

As you'll observe, most of the disk parameters are exactly the same as those for XPANDISK and, again, explanatory words such as 'entries' are optional. One new item that XPANBOSS needs to know is which drive you wish to configure. If you omit the drive argument, the default drive is assumed. But more often than not the target drive is not the current default, so you will want to include the drive letter. You cannot alter a drive that was not installed by XPANDISK, however, so don't worry about accidentally modifying your hard disk. XPANBOSS will let you know if you try, and it will not effect your request.

The two size parameters and directory entries work exactly as they do from the XPANDISK command line in the CONFIG.SYS file. The same holds true for the /M (Minimise) and /A (All) switches. If you enter XPANBOSS without parameters, you'll get a report of XPANDISK's current settings.

There are two new optional switches that do not appear in the XPANDISK syntax. The /R switch is used to make your XPANDISK read-only. Any attempt

## DETUSE SEMICONDUCTORS

(BACKED BY 26 YEARS EXPERIENCE IN THE ELECTRONIC INDUSTRY)  
SMALL AD FOR BIG SAVINGS TO CUSTOMERS

**November Specials: Quality, Excellence,**

**20 Mb Brand Name Hard Disk \$279.00**

**EGA .31 Monitors - \$695** (2 years manufacturer warranty)

**LASER PRINTER, 15 Resident Fonts, 10 Only @ \$2995**

**SCANNER** New Generation 400 DPI selectable, 32 half

tones, O.C.R. (optical character recognition) compatible.

**Full Desktop Publisher plus manuals. 10 only @ \$589**

**STAR: largest selling quality Japanese Text/Graphics Printer.** from \$433.

**AT - PREMIER 20.5 Mb quality hard disk, 1.2 Mb floppy drive, Printer, Serial, Games port, Real Time clock built in. EMS Compatible & AT style Keyboard. Includes 14" dual scan Monitors with 2 yr. Manufacturer Warranty (less if Monitor is not included). SWITCHABLE:**

10 Mhz. \$2099      12 Mhz. \$2155

16 Mhz. \$2489      20 Mhz. \$2695

Full 12 months parts & labor warranty

**XT - PREMIER at \$1395, 20.5 Mb. quality hard disk, Printer, Serial & Games port, Real Time Clock built in, & AT style Keyboard Full 12 months parts & labor warranty**

**PREMIER 386 MACHINE FROM \$4995**

Before you buy ring us for the best price on monitors, printers, other hardware & software.

**Our motto: "We will not be beaten on realistic prices!"**

Suite 29, Chandos Chambers, 56-62 Chandos St., St. Leonards, NSW

**Tel: 02 906 2425 or 02 883 017 or 02 906 2426**

**Mon.- Fri. 10.30 am - 6.00 pm, Sat. 11.00 am - 2.00 pm**

Service Centre: 10 Pope St. Ryde, Tel: 02 809 6941

**NOTE: While stock lasts & price subject to change without notice.**

**Individuals as well as Large Corporations buy from us first because of best prices, they stay with us because of our service!**  
**\$150 FREE SOFTWARE**

MICROSTATION promises: best priced IBM Compatible XT/ATs. Plus best quality support backed by 17 years software experience and 14 years hardware experience. (And best quality Japanese components).

MULTIUSERS SYSTEMS: Novell/Xenix - Accounting Systems

**\$2155**  
**FREE MONITOR**  
**FREE SOFTWARE**

**AT 12 MHZ**

640K RAM, 1.2MB Floppy, 20MB Hard Disk, Serial/Parallel, Mono Monitor, STAWD Business Pack (Spreadsheet, Tutorial, Accounting, Wordprocessing, Database)

**\$1590**  
**FREE MONITOR**  
**FREE SOFTWARE**

**XT TURBO 10 MHZ**

640K RAM, 360K Floppy, 20MB Hard Disk, Multi I/O, Mono Monitor, STAWD Business Pack

**\$2495**  
**FREE MONITOR**  
**FREE SOFTWARE**

**AT 16 MHZ**

1 meg RAM, expandable to 8MB on board, Serial/Parallel, 1.2MB Floppy, 20MB Hard Disk, Mono Monitor, STAWD Business Pack

**SHOP 42, UPPER LEVEL, BIRKENHEAD POINT, OPEN 7 DAYS TILL 6 P.M. THURSDAYS 8 P.M. TELEPHONE 819-6309, 819-6348, FAX 819-7612**

**MICROSTATION**

# WE HAVE THE MONOPOLY ON QUALITY & SERVICE

If speed, power, portability and price are a criterion, call Cartel who supply a wide range of desktop and portable computers.

## DATAMINI - AT - COMPACT DESKTOP

A super-fast Turbo system offering multi-tasking and multi-user. Runs any industrial off-the-shelf software, OS 2, PC-DOS, XENIX etc.  
16-24 Bit 80286 micro-processor (12MHz.)  
640 KByte RAM, expandable to 4Mb on board (LIM EMS compatible).  
Licensed BIOS.  
Choice of Colour graphics or Hercules graphics card.  
Serial and Parallel ports.  
1 x 1.2 MByte Teac floppy drive.  
DR. DOS V3.32

**Priced at \$2190**

(floor stand — tower cabinet version \$2490)

## DATAMINI - XT - COMPACT DESKTOP

An extremely versatile system.  
8088-1 16 BIT micro-processor (10MHz.). 4 layer main board.  
640 KByte RAM, Licensed Phoenix BIOS  
Choice of Colour graphics or Hercules graphics card.  
Serial, parallel and game ports, battery backed up clock and calendar.  
2 x 360 KByte Teac floppy drives.

**Priced at \$1395**

**Optional MS-DOS 3.21.  
With GW Basic add \$140.**

**All prices are inclusive of sales tax.**



## THE DATAMINI 386

The DATAMINI 386, our new generation professional desktop computers prove that there are better and faster ways to versatile business solutions and total office automation.

It is time to get more out of your PC than just simply word processing, and database.

The versatile DATAMINI 386 will propel you to new heights in desktop publishing, data communication, graphic design, networking, office

productivity and a host of other impressive applications beyond your wildest imagination.

And with UNIX OS or ZENIX OS, the DATAMINI 386 becomes a truly multi-tasking multi-user desktop.

Users can now tap the best from either operating softwares as it can handle a wide range of applications — customized or off-the-shelf; covering commercial, technical and even scientific applications.

In addition, users can utilize a broad range of operating

environments including OS/2, PC-MOS AND DOS 3.3.

Such diversity and variety of business solutions were otherwise in the past only available to mini and mainframe systems.

**Tower — Floor Stand configuration. \$6590**

inc. 2Mb Ram and 70Mb voice coil hard disk

## THIS MONTH'S SPECIALS!!!

**16MHz AT (NEAT)  
with 40Mb hard disk**

**\$2850**

**STAR NX-1000 printer**

**\$428**

## XT TURBO DESKTOP

8088-1 16 BIT micro-processor (10MHz.)  
640 KByte RAM, Licensed BIOS.

Choice of Colour graphics or Hercules graphics card.

Serial, parallel and games ports, battery backed up clock and calendar.

2 x 360 KByte floppy drives.

Extended keyboard

**Priced at \$1195**

## OTHER PRODUCTS AVAILABLE

Call for super discount prices on:  
**THOMSON & DMC Monitors**  
**STAR & BROTHER Printers**  
**TANDON & RODIME Hard Drives**  
**INTERLINK Modems**  
**EVEREX DISPLAY CARDS**

## COMPACT/AT TURBO DESKTOP

640KB RAM memory — expandable to 4MB on main board.

**Memory management:**

Lotus Intel/Microsoft  
(LIM EMS) compatible

640 + 384 KB EMS or Extended.

640 + 1408 KB EMS or Extended.

640 + 3456 KB EMS or Extended.

6/12 MHz zero or one wait state selectable.

1.2 MB Floppy Disk Drive (Japan).

40 MB Hard Disk Serial/Parallel card.

Choice of colour graphics or Hercules graphics card. 101 keys keyboard with Tactile feed back and slope adjustable.

**Priced at \$2490**

ACD and Cartel have merged and moved to bigger, brighter and more modern premises. Please now note the new address under our logos'.



**CARTEL  
PERSONAL  
COMPUTERS**



**Australian Computer Distributors**

146 Hawthorn Road, Caulfield, 3161.

Telephone: (03) 528 1988.

Facsimile: (03) 528 5360.

Our full 12 months Warranty is covered nationally by Datacraft Services Pty. Ltd. — a member of the Datacraft Group.

# PRODUCTIVITY

```

000 REM - BASIC PROGRAM TO CREATE XPANDISK.SYS
010 CLS:PRINT "Creating XPANDISK.SYS": OPEN "XPANDISK.SYS" AS #1 LEN = 1
020 FIELD #1, 1 AS A: CHECKSUM=0
130 FOR I = 1 TO 117
140 LINENUM=0: LOCATE 2,3: PRINT "Countdown: " 117 - I:
150 FOR J=0 TO 15: READ BYTES: BYTES = VAL("&H" + BYTES)
160 CHECKSUM# = CHECKSUM# + BYTE: LINENUM# = LINENUM# + BYTE
170 IF (BYTE 256) THEN LSET AS=CHR$(BYTE): PUT #1
180 NEXT J
190 READ LINETOTS: LINENUM# = VAL("&H"+LINETOTS)
200 IF LINENUM# = LINENUM# THEN GOTO 220
210 LOCATE 4,2: PRINT "Error in line #": 260 + 10 * I: GOTO 260
220 NEXT I
230 CLOSE: READ FILETOTS: FILECHECK# = VAL(FILETOTS)
240 IF CHECKSUM# = FILECHECK# THEN GOTO 260
250 PRINT: PRINT "XPANDISK.SYS created successfully": SYSTEM
260 PRINT: PRINT "XPANDISK.SYS not valid!": END
270 DATA FF, FF, FF, FF, FF, 0, 40, 17, 0, 22, 0, 1, 0, 0, 0, 0, 0,
280 DATA 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
290 DATA 0, CB, 50, 53, 51, 52, 1E, 6, 56, 57, 55, 9C, FC, E, 1F, 80,
300 DATA 3E, 12, 0, 1, 88, 1, 80, 75, 18, C4, 3E, 13, 0, 26, 8A, 5D,
310 DATA 2, 80, FB, C, 88, 3, 80, 77, 8, 32, FF, D1, E3, FF, 97, 66,
320 DATA 0, C5, 3E, 13, 0, D, 0, 1, 89, 45, 3, 9D, 5D, 5F, 5E, 7,
330 DATA 1F, 5A, 59, 58, 58, CB, BF, 6, 25, 1, 39, 1, F4, 1, 4B, 1,
340 DATA 22, 1, 22, 1, 22, 1, 4B, 1, 4B, 1, 22, 1, 22, 1, 30, 2,
350 DATA 0, 0, 5B, 58, 4D, 4E, 4, 48, 4, 49, 53, 4B, 0, 1, 1, 0,
360 DATA 1, 40, 0, 0, 1, 2, 1, 0, 8, 0, 1, 0, 0, 0, 0, 40, 0,
370 DATA 0, 1, 40, 0, 40, 0, 0, 0, 0, 1, 8B, 0, 50, 43, 4D, 41, 47,
380 DATA 20, FE, 20, 4D, 4A, 4D, 28, 0, 0, 0, 0, 0, 0, 0, 0, 0,
390 DATA 0, 0, 60, E1, 10, 0, 0, 0, 0, 0, 0, 0, 41, 50, 43, 20, 50,
400 DATA 72, 6F, 64, 75, 63, 74, 69, 76, 69, 74, 79, D, A, 44, 69, 73,
410 DATA 20, 53, 69, 74, 65, 20, 20, 20, 20, 20, 20, 20, 20, 20, 0,
420 DATA 4B, D, A, 53, 65, 63, 74, 6F, 72, 20, 53, 69, 74, 65, 20,
430 DATA 20, 20, 20, 20, 20, D, A, 44, 69, 72, 65, 63, 74, 6F, 72,
440 DATA 79, 20, 45, 6E, 74, 72, 69, 65, 73, 20, 0, 0, 0, 0, 0,
450 DATA 0, 0, 33, C0, C3, 26, C6, 45, E, 1, 80, 3E, A8, 0, 1, 75,
460 DATA 5, 26, C6, 45, E, FF, C3, C0, C3, 26, C7, 45, 12, 8B, 0, 26,
470 DATA 4D, 14, C6, 6, A8, 0, 0, 33, C0, C3, 26, 8A, 45, 2, A2,
480 DATA 1B, 1B, 8, 8, 8, 8, 1, 7, 3, 3, 3, 3, 3, 3, 3, 3, 3,
490 DATA 26, 8B, 4D, 12, 26, 8B, 6D, 1A, C8, DD, 3B, 2E, 93, 0, 8B, 8,
500 DATA 80, 73, 8, 3, 1D, 3B, 1E, 93, 0, 76, 7, 26, C7, 45, 12, 0,
510 DATA 0, C3, 8B, 16, 9B, 1, B, 4, 47, CD, 67, A, E4, 8B, 2, 80, 75,
520 DATA EA, 1E, 8B, 16, 8B, 0, 26, 8B, 45, 10, 26, 8B, 7E, 5E, 8B, 1E,
530 DATA 1C, 1, 80, 3E, 1B, 1, 4, 75, 3, 93, 8B, FE, 8E, D8, 8E, C3,
540 DATA 8B, 8B, 8B, 8B, 8B, 8B, C5, F7, E2, B9, 0, 40, 47, 1, 3B, C3,
550 DATA 74, 1B, 8B, D8, 2E, 8B, 1, 3, 7, 4, H, 8B, 8B, 8B, 8B,
560 DATA 8B, FA, 32, C0, 2E, 8B, 1E, 1, B, 4, 4, CD, 67, 5A, 8B, CA,
570 DATA D1, E9, F3, A5, 45, 59, E2, CB, 1F, 8B, 1E, 1, B, 4, 4, CD,
580 DATA 67, 33, C0, C3, B9, 10, 0, 26, 3B, 4D, 12, 74, 1, 26, C7, 45,
590 DATA 12, 0, 0, 88, 1, 80, EB, 27, 1E, 6, 51, 26, 8E, 5D, 10, BE,
600 DATA 81, 0, EB, 5E, 0, 59, 7, 1F, BE, CB, 0, 26, 8B, 45, 2, 2E,
610 DATA 8B, 8B, 8B, 8B, 8B, 8B, 8B, 8B, 8B, 8B, 8B, 8B, 8B, 8B, 8B,
620 DATA 8B, 10, 0, 26, 3B, 4D, 12, 75, 30, 6, 57, BE, CB, 0, 26, 8B,
630 DATA 45, E, 26, 8E, 45, 10, 8B, FB, F3, A6, 5F, 7, 75, 1B, 80, 3E,
640 DATA A6, 0, 1, 75, D, 8B, 16, 1E, 1, B, 4, 45, CD, 67, E8, 5, 0,
650 DATA 72, 7, E8, B, 2, 33, C0, EB, 9, 26, C7, 45, 12, 0, 0, B8,
660 DATA 0, 1, 80, C3, E, 7, 26, C6, 0, 6, A6, 0, 0, 26, C6, 6, A7, 0,
670 DATA 26, C7, 4E, 8E, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 26,
680 DATA 67, C7, 4E, 8E, 0, 0, 0, 0, 0, 0, 0, A6, 3C, 74, 2A, 3C, 74,
690 DATA 74, 1C, 3C, 2F, 75, F3, AC, 3C, D, 74, 13, 3C, A, 74, F, 24,
700 DATA 5F, 3C, 3D, 75, A, 26, C7, 6, 9E, 0, 10, 0, EB, 73, C3, 3C,
710 DATA 41, 75, 9, 26, C7, 6, 9E, 0, 0, 80, EB, 65, 3C, 5D, 75, 6,
720 DATA 26, C6, 6, A7, 0, 1, 3C, 57, 75, 2, 33, ED, E8, 5B, 0, 3C,
730 DATA 44, 75, 18, 83, FB, 10, 73, 3, BB, 10, 0, 81, FB, 0, 80, 76,
740 DATA 8B, 8B, 8B, 8B, 8B, 8B, 8B, 8B, 8B, 8B, 8B, 8B, 8B, 8B, 8B,
750 DATA 8B, 0, 3B, D9, 76, A, B9, 0, 2, 3B, D9, 73, B9, 1, 1,
760 DATA 26, 89, E, A0, 0, EB, 1A, 3C, 45, 75, 1C, 83, FB, 4, 73, 3,
770 DATA BB, 4, 0, 81, FB, 0, 2, 76, 3, BB, 0, 2, 26, 89, 1E, A2,

```

|      |      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |
|------|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|
| 800  | DATA | 0  | 26 | 80 | E  | A6 | 0  | 1  | 29 | 5F | FF | 50 | 33 | DB | AC | 3C  | D   | 5P5 |
| 790  | DATA | 74 | 20 | 3C | A  | 74 | 1C | 3C | 2F | 74 | 18 | 2C | 30 | 72 | EF | 3C  | 9   | 463 |
| 800  | DATA | 77 | EB | 98 | 93 | 89 | A  | 0  | F7 | E1 | 72 | 4  | 4  | D8 | 73 | DE  | BB  | 885 |
| 810  | DATA | FF | FF | 4E | 58 | C3 | 6  | 57 | 8B | 1E | 9E | 0  | 83 | C3 | 1F | B1  | 4   | 725 |
| 820  | DATA | D3 | EB | 4B | 75 | 4  | F9 | 89 | 8F | 0  | B4 | 43 | CD | 67 | A  | E4  | 75  | 881 |
| 830  | DATA | F1 | 89 | 1E | 20 | 1  | F9 | 16 | 1E | 1  | D3 | E3 | 89 | 1E | A4 | 0   | 8B  | 603 |
| 840  | DATA | 2E | 40 | 06 | 4  | F7 | E3 | 2B | C5 | 83 | D4 | 0  | 3B | D5 | 72 | 733 |     |     |
| 850  | DATA | 4  | 4  | 5  | 2B | EE | 7  | 75 | 40 | B  | 3C | 75 | 2  | 48 | 48 | 3   | 93  | 507 |
| 860  | DATA | 0  | 50 | 89 | 2E | 8B | 0  | 8B | 5  | D1 | 5  | D3 | EA | A1 | A2 | 0   | F6  | 79E |
| 870  | DATA | F2 | 80 | 4C | FF | 14 | 0  | 32 | E4 | 8B | D8 | F6 | E2 | A3 | 91 | 0   | 58  | 926 |
| 880  | DATA | B1 | 1  | 3D | FE | 7F | 72 | 2  | FE | C1 | 88 | E  | 8D | 0  | 2B | C3  | 48  | 6F8 |
| 890  | DATA | D0 | 89 | D3 | E8 | 8B | C8 | D1 | E0 | B3 | FF | B1 | F9 | F7 | F  | 77  | 0   | B28 |
| 900  | DATA | 3  | C1 | 40 | D1 | E8 | 32 | D8 | 33 | D2 | F7 | F5 | 83 | C2 | FF | 15  | 0   | 914 |
| 910  | DATA | A3 | 96 | 0  | E8 | 4  | 0  | F8 | F  | 7  | C3 | 53 | 8B | 16 | 1E | 1   | 559 |     |
| 920  | DATA | 8B | E  | 73 | 20 | 8  | 8  | 8  | 8  | 8  | 8  | 8  | 8  | 8  | 8  | 8   | 8   | 8   |
| 930  | DATA | B8 | B4 | 44 | CD | 67 | E2 | F5 | A1 | 1C | 1  | 8E | C0 | 33 | FF | BE  | 80  | 957 |
| 940  | DATA | 0  | B9 | F  | 0  | F3 | A5 | 8B | 3E | 8B | 0  | A1 | 96 | 0  | F7 | E7  | 8B  | 754 |
| 950  | DATA | C8 | 80 | FE | AA | 8B | FF | FF | AB | 5B | 8A | C3 | AA | 83 | E9 | 4   | D1  | 814 |
| 960  | DATA | E9 | 33 | CO | F3 | AB | BE | AB | 0  | B9 | 10 | 0  | F3 | A5 | 8B | 1E  | 91  | 87E |
| 970  | DATA | 0  | 4B | B1 | 4  | D3 | E3 | 8B | CB | F3 | AB | C6 | 6  | A8 | 0  | 1   | C3  | 7E2 |
| 980  | DATA | BE | D8 | 0  | E8 | 22 | 0  | A1 | A4 | 0  | E8 | 2C | 0  | BE | F0 | 0   | E8  | 792 |
| 990  | DATA | 16 | F  | 8  | 8  | 8  | 8  | 8  | 8  | 8  | 8  | 8  | 8  | 8  | 8  | 8   | 8   | 533 |
| 1000 | DATA | 0  | E8 | 14 | 0  | C3 | E8 | 5E | 0  | AC | A  | C0 | F5 | F8 | C3 | B4  | E   | 715 |
| 1010 | DATA | CD | 10 | C3 | B4 | 9  | CD | 21 | C3 | BB | A  | 0  | 33 | C9 | 33 | D2  | F7  | 7CB |
| 1020 | DATA | F3 | 80 | C2 | 30 | 52 | 41 | 3D | 0  | 0  | 75 | F2 | 8B | D9 | 58 | ED  | 81D |     |
| 1030 | DATA | FF | E2 | FA | C3 | D  | A  | 58 | 50 | 41 | 4E | 44 | 49 | 53 | 48 | 2E  | 53  | 698 |
| 1040 | DATA | 59 | 53 | 20 | 31 | 2E | 30 | 20 | 28 | 43 | 29 | 20 | 31 | 39 | 38 | 38  | 20  | 329 |
| 1050 | DATA | 5A | 69 | 66 | 66 | 20 | 43 | 6F | 6D | 6D | 75 | 65 | 69 | 63 | 61 | 74  | 69  | 628 |
| 1060 | DATA | 5F | 73 | 20 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65  | 65  | 65  |
| 1070 | DATA | 61 | 7A | 69 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65  | 65  | 65  |
| 1080 | DATA | 2E | 20 | 4D | 65 | 66 | 66 | 6F | 72 | 64 | D  | A  | A  | 53 | 79 | 6E  | 74  | 420 |
| 1090 | DATA | 61 | 78 | 3A | 20 | 58 | 50 | 41 | 4E | 44 | 49 | 53 | 48 | 2E | 5  |     |     |     |

*XPANDISK.BAS: Run this Basic program to automatically create the same XPANDISK.SYS file created with XPANDISK.ASM*

to write to a read-only disk will fail — including attempts by Trojan horse programs. For this reason you may wish to try out newly downloaded programs on a protected XPANDISK. Invoking the read-only status is also handy in preventing data files from being accidentally written over.

Obviously, you don't want to make your RAMdisk read-only before you've put anything on it, which is why the /R switch doesn't appear in the XPANDISK syntax. (In fact, XPANDISK will blindly make a disk read-only if you were silly enough to add the /R switch.) You can remove the read-only attribute of the disk at any time (without disturbing the data) by simply entering XPANBOSS without any parameters except the drive specifier. None of the attribute-changing programs, such as ATTRIB, can remove the disk's read-only setting.

It's important to realise, however, that with the exception of the /R (Read-only) option, changing RAMdisk's configuration reformats it as a blank disk, wiping out any previous files stored on it. The

effect is the same as if you'd entered the DOS FORMAT command. I could (with enough effort) have written XPANBOSS in such a way as to allow making a disk larger without losing data, but, obviously, cutting a disk down in size would still lose files. To keep things simple, therefore, XPANBOSS starts the RAMdisk out with a completely clean slate after resizing.

For this reason, whenever you try to change the disk size you are warned and asked if you wish to continue. The prompt requires you to type a 'Y' and press Enter before XPANBOSS will make any changes. Pressing any other key combination aborts the XPANBOSS command so you can go back and save any files you want onto a more permanent medium.

There are times, however, when a confirming response would be a nuisance. With this in mind, I included the /W (Without asking) option. If you add /W to the command line, XPANBOSS will reformat the disk without any warning, so use it with caution. It comes in very

handy, however, when executing XPAN-BOSS from a batch file. (See the box 'Using XPANDISK'.)

## Understanding XPANDISK

Device drivers come in two basic flavours: character drivers, which process a character stream serially (one byte at a time); and block drivers, which are able to handle a block of data at a time. Disk drives fall into the block driver category.

The role of a block device is to interpret the device and to shuttle sectors of data between DOS and the device. Normally, with a physical drive this involves moving the disk head to the appropriate track and saving or retrieving the data to or from the media. The 'device' in XPANDISK's case is not a physical drive, of course, but expanded memory. Thus, all that XPANDISK does is move the data between DOS and the expanded memory.

The expanded memory addressing is a





# Pay-If-You-Like Software

Why pay hundreds of dollars for software? The alternative will now save you even more money and time.

NEW  
TOLL FREE  
ORDER HOTLINE  
008 777 601  
in Brisbane 374 1099

Many IBM and compatible users are now aware of SHAREWARE. That's the approach to marketing software which bypasses the high publishing and distribution costs to give you software at the lowest possible price. For a nominal fee you can obtain high quality software and if you like that software you are encouraged to register with the author. This registration usually costs between \$20 and \$150. In the past most registrations have needed to be sent to the USA - that meant obtaining a bank draft, waiting and wondering what you'll get and then often you would need to spend a couple of hours at customs paying duty and sales tax.

Now things have changed! We can now offer registration for many SHAREWARE products and save you the trouble of dealing with overseas authors. The registration fee of course varies from product to product but in every case you'll save both time and money. Products marked with a ☆ on this page can be registered with us - many of them exclusively with us.

You need not be a member to purchase our disks. Members receive our 400+ page Directory, bimonthly magazines and discounts on disks. Right now members (and that includes new members who use the coupon on this page) can purchase a selection of ten disks from the library for just \$59.50 including tax (+\$5 p&h). (\$NZ99.50+\$5). That is just

**\$5.95**

per disk  
\$9.95 per disk in NZ

If you decide that you don't like the software you may still keep it. You only pay the author's registration fee if you like the software and decide to use it. Manuals are included on the diskette or you can purchase our new publication "Up and Running in 15 Minutes" which covers the products marked ✓ on this page.

The following is a small selection from the library:

☐ **#5, #730 & #1015 PC-FILE+ (3 disk set) ✓ ☆**

Jim Button's very popular database system. Works with other Buttonware software eg PC-TYPE, PC-CALC+.

☐ **#78 & #627 PC-WRITE (2 disk set) ✓ ☆**

The famous Shareware word processor from Quicksort. Everything you need in a word processor including spell check.

☐ **#90 & #594 GENEALOGY ON DISPLAY (2 disk set)**

Written in BASIC with concern for the novice Genealogist. As well as the expected features eg printing family trees, family group sheets, and descendants charts the program creates parentchild indexes and prints ID numbers.

☐ **#105 PC PROFESSOR**

A very popular tutorial on the BASIC programming language which increases in complexity as the user progresses.

☐ **#199, #1016 & #1017 PC-CALC+ (3 disk set) ✓ ☆**

A new version of the popular and easy to use spreadsheet program from Buttonware.

☐ **#287 & #288 FILE EXPRESS (2 disk set) ☆**

Expressware's great new easy to use and much more powerful data base system. Very easy to get started as it comes complete with an on disk tutorial.

☐ **#320 TOUCHTYPE**

A colorful way to improve your typing. Suits either PC or newer enhanced keyboards.

☐ **#344, #345, #1032 & #1124 PC KEY-DRAW (4 disk set) ☆**

Combines CAD, paint, slide show and desk top publishing into one package. Fast and easy to use with or without a mouse.

☐ **#403 PC-TUTOR**

Ideal for new users to gain an understanding of your PC and how to use it. Checks on your progress with question answer format.

☐ **#404 EZ-FORMS ☆**

Create your own master forms exactly as you want them. Great for small businesses.

☐ **#455, #681 & #682 PC-TYPE (3 disk set) ☆**

Jim Button's WP with on line help, spelling checker, whoops key, and mailmerge which works with PC-FILE, Wordstar and ASCII files.

☐ **#480 PC OUTLINE ✓ ☆**

One of the very best Shareware products. Can outline and organize documents point by point. Ideal for essays and the like. From Brown Bag Software.

☐ **#499 PROCOMM ✓ ☆**

Datastorm Technology's state of the art telecommunications software.

☐ **#505 PC STYLE ☆**

Analyses text files for readability - considers the number of words per sentence, % of words of specific length, personal words, action words. Make your writing read better.

☐ **#523 SIDEWRITER**

Turn your spreadsheet on its side and print it on your Epson or compatible printer down instead of across the page.

☐ **#524 & #525 EXPRESS CALC (2 disk set) ☆**

One of the better Lotus 123 clones handling worksheets up to 64 columns by 256 rows. Complete with tutorial and documentation.

☐ **#528 NEW YORK WORD ☆**

A sophisticated WP originally written for larger machines. Includes hyphenation and de-hyphenation.

☐ **#608 AUTOMENU ✓**

Magee Enterprises menu management program that has become one of the fastest selling Shareware programs.

☐ **#641 MAHJONG (Australian author)**

A fascinating game with extraordinary graphics on colour or Hercules mono. Excellent documentation for beginners with play levels from beginner to excellent.

☐ **#646 AMY'S FIRST PRIMER**

Six games to teach basic reading skills to a pre-reading child. Positive reinforcement helps the learning can be fun approach.

☐ **#669 & #670 GRAPHTIME II (2 disk set, Australian author) ☆**

Business presentation graphics with line column and pie charts. Works with dBase Multiplan and Lotus. Hercules version on #833 & #834.

☐ **#687 & #688 ACS IN-CONTROL (2 disk set, Aust. Version) ☆**

Comprehensive contact filing system with on-line documentation, high speed search, electronic card file and tickler file. Can graphically display appointments for next two weeks.

☐ **#696 QUBE-CALC ☆**

Three dimensional spread sheet with on line help and powerful macros.

☐ **#705 CHILDRENS GAMES**

A straight forward approach to making fun educational with good graphics. Geared for 2 to 10 year olds.

☐ **#726 GOALSEEKER ☆**

Finds answers fast by working backwards in Lotus, VP Planner, Supercalc 3/4 or Multiplan.

☐ **#727 POWERMENU ✓ ☆**

Brown Bag Software's menu system with 10,000 selections. All your applications can be a keystroke away!

☐ **#728, #729 & #1112 HOMEBASE (3 disk set) ☆**

A new version of Brown Bag's memory resident desktop organiser. PC Magazine said, "It delivers the most bang for the buck among desktop organisers."

☐ **#765 GALAXY ✓ ☆**

A new leader in Word Processors with enough versatility and strength to be valuable to both the beginner and professional user.

☐ **#780 BRIDGEPAL**

A great way to practice your bridge with up to three partners.

☐ **#800 BAKER'S DOZEN ☆**

A collection of more than 13 utilities from Buttonware.

☐ **#812 & #813 SOAR (2 disk set)**

Service Oriented Accounts Receivable for businesses that provide services as well as products. Menu driven and easy to operate.

☐ **#816 & #817 TURBO C TUTORIAL (2 disk set)**

Programmers who know other languages will be very familiar with Turbo C when they complete the lesson.

☐ **#819 CROSSWORD CREATOR**

Ideal as a learning tool but can be used by anyone who enjoys designing or solving crossword puzzles.

☐ **#828 EDRAW ☆**

Sophisticated graphics able to draw schematics, block diagrams, flowcharts and can even be used to lay out a printed circuit board.

☐ **#830 WAMPUM**

A full featured menu driven implementation of dBase III. Can be used for application development and an enduser database management system.

☐ **#836 DISK COMMANDO**

Seventeen utilities for your floppy or hard disk drives. Shareware's answer to Norton Utilities.

☐ **#844 FUN KEYS, EDUCATIONAL FOR CHILDREN**

Teaches the alphabet to 2 to 5 year olds by showing pictures for each letter and playing nursery rhyme melodies.

☐ **#855 FASTBUCKS ☆**

A menu driven home budgeting system.

☐ **#870 HGCIBM - COLOUR EMULATION FOR HERCULES**

Enables software written for colour cards to run on the Hercules mono card.

☐ **#878 TEACHERS DATABASE FOR THE CLASSROOM**

Not just a database but test scores may be weighted, averaged, statistically analysed, changed to a percentage or changed to a letter grading. Saves significant amounts of teacher's time.

☐ **#879 BIORYTHM MONTHLY SCHEDULE PROGRAM**

Not only can you produce a Biorythm but compare those of two people for compatibility.

☐ **#893 PRIVATE LINE AND WEAK LINK**

Private Line is an encryption/decryption program. Weaklink connects two PC's via their serial ports and allows file transfers. For example file transfers can be made from the 5.25" drive on one machine to a 3.5" drive on another.

☐ **#909 & #910 dTIME KEEPER (2 disk set)**

Can record time by the minute for a number of employees. Provides current accounts receivable totals and enables automatic billing of standard charges. Menu driven.

☐ **#918 CAMBRIDGE THOROUGHbred HANDICAPPER**

Attempts to predict future performances by analyzing the past performances. Also gives a betting strategy.

☐ **#923 PROFESSIONAL REAL ESTATE ANALYST**

A set of Lotus macros to analyse the return on a property using up to 14 different measures.

☐ **#1007 C WINDOW TOOLKIT**

Designed for the novice and intermediate C programmers who want full screen, colour, cursor control and windowing capabilities without complex escape sequences or DOS level interrupts. Even more features for the experienced programmers.

☐ **#1058 EXPRESS GRAPH ☆**

Easy to use business graphics - Input your own data or load from a spread sheet.

☐ **#1110 MINDREADER ☆**

A curious mix of W.P., spell checker, address book - great for the slow typist as it predicts what you may type next.

☐ **#1119 FLU-SHOT +**

We check carefully for a virus before we include a disk in our library but FLUSHOT will enable you to write protect your hard disk just in case.

Yes, I would like to try the following PC-SIG software:

|                                  |       |           |       |            |
|----------------------------------|-------|-----------|-------|------------|
| <b>TOTAL</b>                     | 5.25" | @ \$13    | _____ | \$NZ15     |
| <b>ANNUAL MEMBERSHIP</b>         |       | @ \$38    | _____ | \$NZ50     |
| <b>NEW MEMBERS X-TRA SPECIAL</b> |       |           |       |            |
| Membership + 10 Disks            | 5.25" | @ \$97.50 | _____ | \$NZ149.50 |

|                                |        |       |        |
|--------------------------------|--------|-------|--------|
| "UP AND RUNNING IN 15 MINUTES" | @ \$28 | _____ | \$NZ35 |
|--------------------------------|--------|-------|--------|

Add \$2 (\$NZ 3) for each 3.5" disk.

POSTAGE AND HANDLING \$5.00

**TOTAL**

Payment by. ☐ Cheque ☐ COD (Aus only)

☐ Visa ☐ Bankcard ☐ Mastercard

Card No. \_\_\_\_\_

Expiry: \_\_\_\_\_ Signed \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

State \_\_\_\_\_ Code \_\_\_\_\_

**MANACOMM PTY LTD**

|      |                                       |                     |
|------|---------------------------------------|---------------------|
| Mail | Freepost No 29<br>(No stamp required) | Call on 07 374 1311 |
|      | PO Box 509                            | Fax on 07 374 2274  |
|      | Kenmore Qld 4069                      | Viatel #49000*      |
|      |                                       | Orders 008 777 601  |



**Represented in NZ by:**

Software Plus  
172-6 Ponsonby Rd  
Auckland  
09 76 2667

All prices include applicable sales tax or GST.  
© PC-SIG, Manacomm 1988

## Using XPANDISK

A couple of specific examples may stimulate your thinking about how best to make use of XPANDISK. For starters, you'll find that a RAMdisk is an ideal place to put COMMAND.COM. The reason is that large programs often overwrite the transient portion of COMMAND.COM that resides in high memory. Therefore, COMMAND.COM must be reloaded when you exit the application. If you have a floppy-disk-based system, that's the reason you get the 'Insert a disk with COMMAND.COM' message.

In order to reload its missing part, the resident portion of COMMAND.COM searches the environment for the COMSPEC= statement, which is followed by the disk location of COMMAND.COM. (To look at the environment — and the COMSPEC — use the SET command.) Normally, COMSPEC will be the same disk drive from which you booted. Especially if you have a floppy disk system, the disk access needed to reload the transient portion of COMMAND.COM is annoyingly time-consuming. Reloading COMMAND.COM becomes instantaneous, however, if it is loaded from a RAMdisk.

To do this, first COPY COMMAND.COM to the RAMdisk and then change COMSPEC. This is most easily accomplished at boot time from within your AUTOEXEC.BAT. If you have a floppy-disk-only system and XPANDISK is installed as drive C:, you would add to your AUTOEXEC.BAT

```
COPY COMMAND.COM C:\
SET COMSPEC=C:\COMMAND.COM
```

When using this technique, be sure to COPY COMMAND.COM back to drive C: if you use XPANBOSS to resize it. If you don't, so the resident portion of COMMAND.COM can't find itself to load its transient portion, you'll get the awful message 'Cannot load COM-

MAND.COM, System halted'. If that happens, rebooting becomes the only road to recovery.

### Increasing flexibility

There are several ways to utilise the flexibility XPANDISK provides. One of these is to copy all your frequently used program files to the RAMdisk, whence they can be quickly loaded into conventional memory whenever they need to be executed. Again, the best time to do this is when you are booting the machine. Assuming XPANDISK is installed as drive D: and you keep your utilities on drive C: in a directory called UTIL, you would add the following three commands to your AUTOEXEC.BAT:

```
MD D:\UTIL
COPY C:\UTIL\ *.* D:\
PATH D:\UTIL
```

The ideal way to change disk size with XPANBOSS is also from within a batch file. To illustrate, let's assume your gargantuan spreadsheet program needs all of your expanded memory. (That ravenous spreadsheet may have been the reason you got expanded memory in the first place.) The following batch file model would release all excess expanded memory used by XPANDISK for Lotus 1-2-3 to use and then reclaim the memory for the RAMdisk when the spreadsheet session ends:

```
XPANBOSS D:/M/W > NUL
CD \123
123
CD \
XPANBOSS D:/A/W > NUL
```

Note the redirection of XPANBOSS's output to the NUL device. This simply suppresses the syntax message that XPANBOSS would otherwise display. The disk statistics display can't be

prevented, however. That's because the disk report circumvents DOS (and redirection) and is printed to the screen via the BIOS Write TTY function.

After running the batch file above, you would execute another batch file that would copy the appropriate files to the re-enlarged RAMdisk. Let's assume you are headed to an assembly-source-code editing and compiling session. Place the following commands in the MASM.BAT file for compiling the assembly listings that appear in this column:

```
ECHO off
CLS
CD \ASM
MASM %1,D:\%1.OBJ;
IF NOT EXIST D:\%1.OBJ GOTO
END
LINK D:\%1, D:\%1;
EXE2BIN D:\%1 C:\COM\%1.COM
ECHO %1.COM successfully
compiled.
:END
CD \
```

This example assumes that you keep your assembly listings in the \ASM directory of your C: drive and the resulting compiled .COM files in C:\COM directory. D: still represents the XPANDISK drive. The batch file stores the temporary .OBJ and .EXE files created by MASM and LINK on the RAM drive.

Naturally, you will have to modify this sample batch file to fit your actual disk structure. To enhance the batch file and the performance even further, follow the theme of storing program files in RAM by copying MASM.EXE, LINK.EXE, and EXE2BIN.EXE to drive D: when you first boot up the system or before the edit session. You would then preface the three compiler program references in the batch file with D:\. Similarly, you could add D:\ to your path.

simple matter of indexing by an offset of the sector size times the requested sector. DOS takes care of all the nitty-gritty details of maintaining the FAT and directory structure of the disk. The device driver's duty is to maintain the device. With XPANDISK, that means communicating with the EMM provided with your memory board and swapping the memory containing the requested sectors into the 64k window. EMM — also a device specialist — takes care of details such as who owns what memory and

manipulating the registers on the expanded memory board that place particular pages of memory on the bus.

With all this support, then, what might seem on the surface to be a monumental task is quite simple for XPANDISK. XPANDISK is in many ways very similar to the VDISK driver. The main difference is that XPANDISK emulates its disk in expanded memory whereas VDISK uses conventional or extended memory.

### The EMM

From the programmer's point of view, the EMM (Expanded Memory Manager) function requests are accessed in the same way as DOS functions.

The function request is passed to EMM in the AH register, and any errors are returned in AH. The function entry point is via interrupt 67h instead of interrupt 21h. Version 3.x of the EMS (expanded memory specification) has 15 services; several advanced services

# GET IT ALL BACK UP WITH EXABYTE

UP TO 2 GIGABYTES ON A SINGLE 8mm CARTRIDGE

## EXB-8200 8mm Cartridge Tape Subsystem



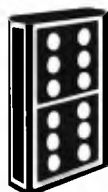
The EXB-8200 8mm Cartridge Tape Subsystem combines removable, rewritable magnetic media with a compact, integrated drive/controller to meet the high storage capacity needs of today's computer systems.

The highest quality, least expensive tape available, and helical scan technology yield a recording density never before achieved. A single, standard 8mm tape cartridge can provide storage for over 2,000 megabytes — 2 gigabytes — of formatted data.

Packaged in a standard 5¼ inch form factor, the EXB-8200 enables unattended disk backup, dramatically reducing manual intervention; high speed file search to quickly access the desired data set; and resident error recovery procedures to increase host system throughput.

Additional features include: Integrated SCSI controller within drive package • Onboard Error Correction Code and Error Recovery Procedures • Integrated speed-matching buffer • High performance data transfer rate • Non-recoverable error rate of less than one in 10<sup>13</sup> bits read • Five cartridge sizes.

EXABYTE's EXB-8200 is the competitively priced solution to your journaling, archiving, data interchange, data acquisition, backup and restore, and software distribution needs.



**Exclusive Australasian Distributor**

Domino Computers Pty. Ltd.

67 Alexander St. Crows Nest NSW 2065

Sydney (02) 436 2733 Melbourne (03) 525 3033



```

; XpanBoss: the control program for the XPANDISK.SYS
; virtual disk expanded memory device driver. 31-10-88

_TEXT      SEGMENT PUBLIC 'CODE'
ASSUME CS: _TEXT, DS: _TEXT
ASSUME ES: _TEXT, SS: _TEXT
ORG        100H

START:     JMP     MAIN

COPYRIGHT DB "XpanBoss 1.0 (C) 1988 Ziff Communications Co."
PROGRAMMER DB "CR, LF, \"APC Magazine\", BOX, \" Michael J. Mefford\", CR, LF, LF

DB "Syntax: XpanBoss [d:][/D disk size][/S sector size][/E entries]"
DB "[/W] [/R] [/M] [/A]", CR, LF, LF
DB "disk size = (16 - 32768)K bytes; default = 64", CR, LF
DB "sector size = (128, 256, 512) bytes; default = 256", CR, LF
DB "entries = (4 - 512) in root directory; default = 64", CR, LF
DB "/W = Change size WITHOUT asking. WARNING: All data will be lost.", CR, LF
DB "/R = Read-only drive", CR, LF
DB "/M = Minimum disk size (16K)", CR, LF
DB "/A = All of available expanded memory", CR, LF, LF

DB "Use XpanBoss to control the XPANDISK virtual disk", CR, LF, "$"

BELL EQU 7
CR EQU 13
LF EQU 10
CTRL_Z EQU 26
SPACE EQU 32
BOX EQU 254
Y_SCAN EQU 15H

DRIVE EQU 5CH

PASSWORD DB "APC Productivity"
PASSWORD_LENGTH EQU $ - PASSWORD
PIPE EQU PASSWORD_LENGTH + 1 DUP (?)

DRIVE_MSG DB "Drive $"
ILLEGAL_MSG DB " does not belong to XpanBoss", BELL, CR, LF, "$"
WARNING_MSG1 DB "CR, LF, \"WARNING: All current data of $"
WARNING_MSG2 DB " will be lost.", CR, LF
DB "Do you wish to continue? Y/N $"
FAILED_MSG DB "UNSUCCESSFUL"
CRLF DB "CR, LF, "$"

-----
MAIN PROC NEAR

CLD ; All string moves forward.
MOV DX, OFFSET COPYRIGHT ; Display copyright.
CALL PRINT_STRING

MOV BL, DS:[DRIVE] ; Retrieve drive request.
MOV AL, BL ; Save it.
DEC AL ; Was there a drive request?
JNS GOT_DRIVE ; If yes, use it.

MOV AH, 19H ; Else, get default drive.
INT 21H

GOT_DRIVE: ADD AL, "A" ; Convert to ASCII.
MOV DS:[DRIVE], AL ; Save it and
MOV BYTE PTR DS:[DRIVE + 1], "$" ; convert to DOS string.

MOV DX, OFFSET PIPE ; Request password from
MOV SI, DX ; block device driver.
MOV CX, PASSWORD_LENGTH
MOV AX, 4404H ; IOCTL Read from block device.

INT 21H

MOV DI, OFFSET PASSWORD ; Did device driver return
REPE CMPSB ; required password?
JZ CONTINUE ; If yes, continue.

MOV DX, OFFSET CRLF ; Else, CR and LF to next line.
CALL PRINT_STRING
CALL PRINT_DRIVE ; Print requested drive.
MOV DX, OFFSET ILLEGAL_MSG ; Tell user drive does not
CALL PRINT_STRING ; belong to XpanBoss.
JMP SHORT ERROR_EXIT

CONTINUE: CMP BYTE PTR [SI], 0 ; If Parameters not changed
JZ PARAMETERS ; or /W, skip warning.

CALL WARNING ; Else, warn user.
JNZ EXIT ; Exit if user said no.
MOV DX, OFFSET CRLF ; Else, CR, LF to next line.
CALL PRINT_STRING

PARAMETERS: MOV DX, OFFSET PASSWORD ; Send counter password as
MOV CX, PASSWORD_LENGTH ; CK to XPANDISK.
MOV AX, 4405H ; IOCTL Write to block device.
INT 21H
MOV AL, 0 ; ERRORLEVEL = 0.
JNC EXIT ; If successful, exit.

MOV DX, OFFSET FAILED_MSG ; Else, tell user it failed.
CALL PRINT_STRING
MOV AL, 1 ; ERRORLEVEL = 1.

EXIT: PUSH AX ; Save ERRORLEVEL.
MOV DX, OFFSET CRLF ; Blank line.
CALL PRINT_STRING
POP AX ; Retrieve ERRORLEVEL.
MOV AH, 4CH ; Exit.
INT 21H

MAIN ENDP

WARNING: MOV DX, OFFSET WARNING_MSG1 ; Display warning message.
CALL PRINT_STRING
CALL PRINT_DRIVE
MOV DX, OFFSET WARNING_MSG2
CALL PRINT_STRING

XOR AH, AH ; Get a keystroke.
INT 16H
CMP AH, Y_SCAN ; "Y" key pressed?
JNZ WARNING_END ; If no, quick exit.
MOV AH, 0EH ; Else, display key pressed.
INT 10H
XOR AH, AH ; Retrieve another keystroke.
INT 16H
CMP AL, CR ; Requires a confirming Enter.

WARNING_END: RET

PRINT_DRIVE: MOV DX, OFFSET DRIVE_MSG
CALL PRINT_STRING
MOV DX, 5CH ; Requested drive.

PRINT_STRING: MOV AH, 9
INT 21H
RET

_TEXT ENDS
END START

```

**XPANBOSS.ASM:** The assembly language listing for XPANBOSS.COM, the program that lets you control the size of the XPAN-DISK virtual disk from the command prompt. XPANBOSS uses the DOS I/O control service to communicate with XPANDISK

were added with version 4.0, but the hardware as well as the EMM driver has to be upgraded to make use of these advanced services. Fortunately, XPANDISK can do all its work with the original 15 services, which means that it can work with older hardware. Functions 1 to 7 are for general-purpose programming and provide all that's necessary for determining the base (or frame) segment of the 64k expanded memory window, allocating and de-allocating memory, and for transferring the application's allocated pages into the 64k window.

There is one special requirement for device drivers and TSRs. Since an expanded memory application may be running when a device driver or TSR interrupts to access the 64k expanded memory window in use, the interrupt service must save the pages currently mapped into that window before accessing those memory pages. On exit, the expanded memory mapping is then res-

tored to the way it was found. The EMM functions 8 and 9, Save Page Map and Restore Page Map, provide this service. These calls don't actually copy the data safely into a buffer for restoration at a later time, as a TSR might do with video memory. Just the expanded memory board's registers that control which pages are placed on the bus (in the 64k window) are saved and restored by the special EMM function calls.

## Input/output control

The interesting aspect of XPANDISK, of course, is the way XPANBOSS changes the disk configuration. DOS 2.0, which provided the ability to install device drivers, also provided a means by which applications could communicate with those drivers. If you have the DOS *Technical Reference*, you may possibly have flipped through the listing of the long (38 pages) and intimidating-looking function 44h of interrupt 21h. Function 44h

IOCTL (Input Output Control) is divided into numerous subfunctions that are used to pass information between applications and device drivers. Of these, subfunctions 4 and 5 read and write control strings from or to a block device, and are perfect for XPANBOSS. The control strings have meaning only to the application and driver. DOS has no interest in the packet of information; rather, it acts only as the courier in the transaction, passing the information on to the requested drive.

At least that's how it ought to be. IOCTL passes the pointers, not the actual data, to the buffer location of the control string via the DS:BX pair, with the length in CX. The buffer acts as a pipe between the two procedures and works very much like the OS/2 interprocess communication pipe of which you may have heard.

XPANBOSS needs to pass its command-line parameters to XPANDISK so XPANDISK can change BPB (BIOS

# EXPRESS 286/386 COMPUTER

(IBM Compatible with quality Japanese components)

- Good Support
- Reliable
- Professional Service
- Competitive Price
- Backup by 3M Australia nation wide
- 12 months guarantee
- Provided by EXPRESS TECHNOLOGY
- See Below!!! •

## EXPRESS 386 20/25MHz Tower System

- INTEL 80386-20 CPU upgradable to 25MHz
- 1Mb RAM on board upgradable to 8Mb RAM
- Zero or one wait state selectable
- 1.2Mb Floppy Disk (able to r/w 360Kb diskette)
- 44Mb Hard Disk (25-28ms access time)
- 16-bit Hard Disk/Floppy Disk Controller
- Parallel/Serial Card
- MGA/CGA Dual Mode Printer Card
- 102-Key Enhanced Keyboard



INTODUCTORY  
OFFER  
ONLY

**\$6,500**  
inc tax!

## EXPRESS PORTABLE

AT \$3,600 inc. tax

12MHz ZERO WAIT STATE  
640KB AT COMPUTER but built  
into a portable case with LCD dis-  
play, inverse video, 1.2Mb FDD,  
20Mb HD, capable of connecting  
to external monochrome or colour  
monitor.

16MHz AT or 386 can also be built  
into this portable case. Please call  
for competitive price.



## EXPRESS Superfast XT

Japanese Quality Runs 2.9  
times faster than PC.

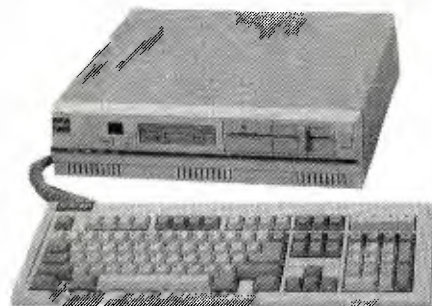
**\$1,140 inc. tax**

- NEC V20 CPU
- 640Kb RAM Memory
- 2 x NATIONAL FDDs
- Colour Graphic Card
- Parallel/Serial/Game Ports
- Clock Calendar with battery  
backup
- 165W Power Supply
- 84-key Keyboard

## EXPRESS 286 16MHz COMPUTER

FOR ONLY **\$3,455 INC. TAX**

- 1Mb RAM memory (upgradable to 4Mb on board)
- 16MHz zero or one wait state selectable
- 1.2Mb Floppy Disk (able to r/w 360Kb diskette)
- 20Mb Hard Disk (65ms access time)
- 16-bit Hard Disk/Floppy Disk Controller
- Parallel/Serial Card
- MGA/CGA Dual Mode Printer Card
- 200W Power Supply
- Compact/Slim AT case with DIGITAL SPEED DISPLAY
- 102-Key Enhanced Keyboard



**EXPRESS 640KB 20MB HD 286 AT  
12MHz ZERO WAIT STATE COMPUTER  
ALSO AVAILABLE FOR ONLY**

**\$2,495 INC. TAX**

DEALERS ENQUIRY WELCOME

# EXPRESS TECHNOLOGY PTY LTD

(formerly Known as EFFICIENT COMPUTER SERVICES PTY LTD)

G/Fl., 84 Wentworth Ave. Surry Hills, NSW 2010

Tel.: (02) 281 1255 Fax.: (02) 281 2973

parameter block). DOS uses BPB to determine the disk's characteristics — the sector size and total sectors, for example. The target device driver's specifier (1 = A, 2 = B, 3 = C, etc) is placed in the BL register before making the IOCTL call. The target drive is either the default or the one specified by the user on XPANBOSS's command line.

But how does XPANBOSS know if the user-requested target drive is an XPANDISK? In a word, it doesn't. Therefore, a prearranged password is first requested from the driver to see if the target drive belongs to XPANBOSS. This is done with the IOCTL subfunction 4, Read from block device. Not to divulge a national security secret, the password I selected is 'APC Productivity'.

DOS routes the IOCTL call to the driver. When XPANDISK gets control, it first parses the command line of XPANBOSS. (The call passes XPANDISK the DS:BX address of the pipe. DS is XPANBOSS's data segment, so XPANDISK parses offset 81h, the command-line buffer of XPANBOSS's PSP.) Along with the password, XPANDISK then returns whether or not parsing resulted in a change request to the disk. At this point no changes to XPANDISK have yet

been made. If, after regaining control from the IOCTL call and validating the password, XPANBOSS finds that changes are to be made, the user is warned and is asked to confirm his request. If the user responds with a 'Yes', XPANBOSS passes the request back to XPANDISK, this time using function 5 (Write to block device).

Again, however, we encounter a problem similar to the one XPANBOSS had identifying the target drive. This time it's simply the other way around, for XPANDISK must be sure that it is receiving an authorised request from XPANBOSS. XPANBOSS, therefore, sends a counter password; XPANDISK verifies and the changes are made. The counter password? It's the same 'APC Productivity'. Without the use of passwords as security, an application that also used IOCTL could blindly trigger a false and disastrous XPANDISK resizing.

## A bug in the bushes

In the original design for XPANDISK, rather than reduce the size of the disk to 16k, I intended that all expanded memory be returned to the EMM pool, making even more memory available for

demanding applications. Any subsequent calls to the driver's INPUT or OUTPUT sector-moving procedures (arising from a user entering DIR with a memoryless disk, for example) returned an Unknown Unit error to DOS. This worked fine. DOS thought the drive was out of commission and returned an alarming but effective message, 'Fatal Error Reading Drive'.

A problem arose, however, when it came time to re-awaken the drive and reclaim some expanded memory. The same approach described above was taken to communicate via IOCTL. With DOS, version 2.1, however, before it would pass XPANBOSS's IOCTL call on to XPANDISK, DOS made an INPUT call to the driver requesting a copy of the FAT sectors. A copy of the FAT? Why DOS wanted a copy of the FAT, I don't know; the FAT has nothing to do with a driver's IOCTL. XPANDISK, of course, was still asleep, and so returned the Unknown Unit error, as there was no disk and no FAT to return. DOS didn't like that answer, so it returned a failed IOCTL call back to XPANBOSS.

In order for XPANDISK to know it was to create a drive, XPANBOSS needed to make contact via IOCTL. But DOS

## ISN'T IT TIME YOUR DATA HAD A LITTLE LIFE ASSURANCE? ... NO WORRIES

**\$89.00**  
INCL. SALES TAX



**AutoSTORE** is a software program that automatically and periodically saves data to a reserved hard disk area.

**AutoSTORE Features:**

- Prevents data loss incurred by: Power failures, accidents, system crash, operator error.
- Compatible with most software.
- Non-copy protected.
- Easy to use without special training.
- In addition to the automatic data saving mode AutoSTORE offers 1200 hot keys which store and recall selected data at will.
- AutoSTORE saves data at user defined intervals automatically.
- AutoSTORE makes costly battery back-up systems obsolete.

Where does AutoSTORE fit in? AutoSTORE is a TSR program which fits in with your Autoexec.Bat file.

\* Enables the operator to "undo" most mistakes.

Consistent use of AutoSTORE means the end of data loss in computer operations. All invaluable data is safe despite unavoidable everyday accidents.

The AutoSTORE software package including instruction manual and floppy disk, for only \$89.00. Stocks are freely available. Don't delay, save your data today.

**THE SOFTWARE LAB**

**AutoSTORE ASSURES THAT ALL IS NOT LOST**

## COMPUTEREYES™



### Video Images for your computer

Now you can easily and inexpensively digitize high quality images from any standard video source - videotape, camera, disk - for display on your computer. Capture time is less than six seconds, and you have complete control of displayed gray scales in monochrome. Computer Eyes has everything you need: Interface hardware, complete easy-to-use software support, and owner's manual. It fully supports most graphics modes including VGA and the images are compatible with virtually all popular graphics programs. Think of the possibilities! Computer Eyes is backed by a one year warranty and the success of over 10,000 systems sold. Demo disk available, \$5.00

|                   |          |
|-------------------|----------|
| Apple II series:  | \$349.00 |
| Commodore 64/128: | \$349.00 |
| Atari:            | \$349.00 |
| IBM PC:           | \$525.00 |

To order call REPLEX mail and fax orders accepted bankcard visa & mastercard postage and handling \$4

**REPLEX**

1st Floor  
118 Queen Street  
Melbourne  
Victoria, 3000  
Australia

Phone: (03) 670 0687  
International: +613 - 670 0687  
Fax: (03) 642 1606

**DIGITAL VISION**

☐ Please send me more information on AutoSTORE. ☐ Please send AutoSTORE software package(s) at \$89.00 each.

MY NAME/TITLE IS \_\_\_\_\_ COMPANY NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_ TELEPHONE NO. \_\_\_\_\_

Please return this coupon to Bill Williams, Zimwil Pty Ltd, PO Box 539, Neutral Bay Junction, NSW 2089, (02) 954 8945, (02) 954 7298.

Method of Payment: ☐ Cheque ☐ Cash ☐ Postal Order ☐ Credit Card Visa/Mastercard/Diners/Amex

Credit Card Number: \_\_\_\_\_ Expiry Date: \_\_\_\_\_

Sender's Signature \_\_\_\_\_ Dealer enquiries welcome.



# SANCOM COMPUTERS

MICROCOMPUTERS, PERIPHERALS AND COMPUTER ENHANCEMENT PRODUCTS  
IBM HARDWARE & SOFTWARE COMPATIBLE 12 months SANCOM WARRANTY on all Computers

- 4 Showrooms / Sales Offices conveniently located at  
**BLACKTOWN, HURSTVILLE, LIVERPOOL & PYRMONT**  
All backed by an efficient SERVICE CENTRE & oversea assembly plant

**VALUE & QUALITY** - Large Purchasing Power for wider range, realistic pricing & assured quality

## SANCOM XT TURBO

4.77/10 MHz V20 CPU

640K RAM 360K Floppy  
84 Keys Low Profile Keyboard

150W Power Supply  
Printer, Serial and Game Ports

Color or Monochrome Graphic Adapter  
Battery backed Real Time Clock

**SYSTEM with 20M H/D \$1630 33M H/D \$1685 40M H/D \$1780 66M H/D \$1860**

## SANCOM AT 10 MHz

80286 6/10 MHz

640K RAM 1.2M Floppy  
84 Keys Low Profile Keyboard

180W Power Supply  
Printer, Serial Ports

Color or Monochrome Graphic Adapter  
Battery backed Real Time Clock

**SYSTEM with 20M H/D \$2290 33mM H/D \$2400 40M H/D \$2440 66M H/D \$2570**

## SANCOM PORTABLE AT

80286 6/10 MHz

Blue Super Twisted Back-lit LCD  
Standard AT motherboard

IBM CGA compatible  
Accepts standard Plug in Boards

Accepts External TTL or Color Monitor  
Dimension : 20x24x40 cm

**SYSTEM with 20M H/D \$3250 33M H/D \$3360 40M H/D \$3400 66M H/D \$3540**

**SANCOM BT 386 : 20MHz 80386 1M RAM 1.2M Floppy Printer & Serial Ports from \$5550**

**SPECIAL SANCOM AT PREMIER 10MHz 0 wait state 42M Voice Coil Hard Disk \$2850**

640K RAM, 1.2M Floppy Drive, Parallel and 2 Serial Ports, Battery backed Real Time Clock, 101 keys Keyboard

## DESK TOP PUBLISHING:

**LASER PRINTER** - Ricoh Engine 6ppm 1M RAM HP Laserjet Plus & Epson emulation Font packs **\$3500**

**SCANNER** - Hand held 105 mm (4.25") Scan width 200DPI resolution Free Desktop Publishing Software **\$ 445**

Scanned image compatible with most other Desktop Publishing software

## NETWORK:

NOVELL NETWARE - Industrial standard network software 4 users \$990 100 users \$3390

ETHERNET - Super fast 10M bps network interface card Single co-axial cable distribution \$ 590

SANCOM FILE SERVER - 10MHz Ows 80286, 640K, 1.2M F/D, 42M VC H/D, Serial & Printer Ports, Mono Monitor, Ethernet \$3600

SANCOM WORKSTATION - 10MHz V20CPU 640K, 360K F/D, Mono Monitor, Ethernet \$1800

ARCHIVE TAPE BACKUP - 60M Internal with controller \$1035

## QUALITY SPECIALS :

Hard Disk Miniscribe with Controller for PC/XT 20M \$590 33M \$645 40M \$740 **NEW BIG 66M \$ 820**

EGA (256k RAM) with 14" Dual Sync Color EGA/CGA Monitor \$ 990

80286 Speed Card Upgrade your PC/XT to AT performance 7 times PC speed \$ 350

Mouse Serial 3 buttons Mouse System & Microsoft Mouse Compatible \$ 95

Color Monitors High Resolution 14" .38 Phos CGA \$495 Dual scan CGA/EGA 14" .31 phos. \$ 790

Multiscan Color Monitor 14" Digital & Analog CGA, MGA, EGA, SEGA, VGA & IBM PS2 compatible \$ 950

Word Processing Monitor white page 15" non-glare \$ 275

Printer IBM / Epson compatible 80 column 11" \$375 136 column 15" \$ 695 LQ/24 pins \$ 750

Diskettes professional quality 360K DS/DD box of 10 \$12 10 boxes \$ 110 1.2M HD box of 10 \$ 35

## SHOWROOMS & SALES OFFICES

Suite 3 34 Campbell Street

Suite 1 10 Woodville Street

The Mall 313 Macquarie Street

Shop 146 313 Harris Street

NEW SHOWROOM OPENING SOON IN

**BLACKTOWN**

**HURSTVILLE**

**LIVERPOOL**

**PYRMONT**

**CHATSWOOD**

(Mon-Fri 9:00am to 5pm Sat 9:30am to 3pm)

(Mon-Fri 9:30am to 5pm Sat 9:30am to 3pm)

(Mon-Fri 9:30am to 5pm Sat 9:30am to 4pm)

(Tue-Fri 9:30am to 5pm Sat 9:30am to 3pm)

Tel: **831 1011**

Tel: **579 3377**

Tel: **602 9088**

Tel: **552 1640**

## SERVICE CENTRE & HEAD OFFICE

1 Athol Street Leichhardt N.S.W. 2040

Trade & dealer enquiries welcome

Tel: DEALER SALES 568 2500 SERVICE 568 2660 Fax: 569 0526

All Prices include SALES TAX

Prices & Specification subject to change without notice

```

100 REM - BASIC PROGRAM TO CREATE XPANBOSS.COM
110 CLS:PRINT "Creating XPANBOSS.COM": OPEN "XPANBOSS.COM" AS #1 LEN = 1
120 FIELD #1, 1 AS AS: CHECKSUM=0
130 FOR I = 1 TO 55
140 LINE$="": LOCATE 2,3: PRINT "Countdown: " 55 - I :
150 FOR J = 1 TO 16: READ BYTES: BYTE = VAL("&"+BYTES)
160 CHECKSUM = CHECKSUM# + BYTE: LINE$ = LINE$ + BYTE
170 IF (BYTE 256) THEN LSET AS=CHR$(BYTE): PUT #1
180 NEXT J
190 READ LINETOTS: LINECHECK# = VAL("&"+LINETOTS)
200 IF LINECHECK# = LINE$ THEN GOTO 220
210 LOCATE 4,2: PRINT "Error in line #": 260 + 10 * I: GOTO 260
220 NEXT I
230 CLOSE: READ FILETOTS: FILECHECK# = VAL("&"+FILETOTS)
240 IF CHECKSUM# = FILECHECK# THEN GOTO 260
250 PRINT: PRINT "XPANBOSS.COM created successfully": SYSTEM
260 PRINT: PRINT "XPANBOSS.COM is not valid!": END
270 DATA 99, BB, 2, D, A, 58, 50, 41, 4E, 42, 4F, 53, 53, 20, 31, 2E, 4AA
280 DATA 30, 28, 43, 29, 20, 31, 39, 38, 38, 20, 5A, 69, 66, 66, 20, 3AD
290 DATA 43, 6F, 6D, 6D, 75, 6E, 69, 63, 61, 74, 69, 6F, 6E, 73, 20, 43, 62C
300 DATA 6F, 2E, D, A, 41, 50, 43, 20, 4D, 61, 67, 61, 7A, 69, 6E, 65, 4D4
310 DATA FE, 20, 4D, 69, 63, 68, 61, 65, 6C, 20, 4A, 2E, 20, 4D, 65, 66, 5A1
320 DATA 6E, 6F, 72, 64, D, A, 53, 79, 6E, 74, 61, 78, 3A, 20, 58, 505
330 DATA 50, 41, 4E, 42, 4F, 53, 53, 20, 5B, 64, 3A, 5D, 5B, 2F, 44, 20, 47A
340 DATA 64, 69, 73, 6B, 20, 73, 69, 7A, 65, 5D, 5B, 2F, 53, 20, 73, 65, 5B8
350 DATA 63, 74, 6F, 72, 20, 73, 69, 7A, 65, 5D, 5B, 2F, 45, 20, 65, 6E, 5B2
360 DATA 74, 72, 69, 65, 73, 5D, 5B, 2F, 57, 5D, 5B, 2F, 52, 5D, 5B, 2F, 585
370 DATA 4D, 5D, 5B, 2F, 41, 5D, D, A, 64, 69, 73, 6B, 20, 73, 69, 49A
380 DATA 74, 65, 20, 20, 20, 20, 28, 31, 36, 20, 2D, 20, 33, 32, 37, 334
390 DATA 36, 38, 29, 48, 20, 62, 79, 74, 65, 73, 3B, 20, 64, 65, 66, 61, 514
400 DATA 75, 6C, 74, 20, 3D, 36, 34, D, A, 73, 65, 63, 74, 6F, 72, 4E3
410 DATA 20, 73, 69, 74, 65, 20, 20, 28, 31, 32, 38, 2C, 32, 35, 36, 3E4
420 DATA 2C, 35, 31, 32, 29, 20, 62, 79, 74, 65, 73, 3B, 20, 64, 65, 66, 4B8
430 DATA 61, 75, 6C, 74, 20, 20, 20, 32, 35, 36, D, A, 65, 6E, 74, 72, 4A0
440 DATA 69, 65, 73, 20, 20, 20, 20, 20, 3D, 28, 34, 20, 2D, 20, 35, 33C
450 DATA 31, 32, 29, 69, 6E, 20, 72, 6F, 74, 20, 64, 69, 72, 65, 63, 5E6
460 DATA 74, 6F, 72, 79, 3B, 20, 64, 65, 66, 61, 75, 6C, 74, 20, 3D, 20, 5B8
470 DATA 36, 34, D, A, 2F, 57, 20, 3D, 20, 43, 68, 61, 6E, 67, 65, 20, 3EA
480 DATA 73, 69, 7A, 65, 20, 57, 49, 54, 4E, 4F, 55, 54, 20, 61, 73, 6B, 56E
490 DATA 69, 6E, 67, 2E, 20, 57, 41, 52, 4E, 49, 4E, 47, 3A, 20, 41, 6C, 4A9
500 DATA 6C, 20, 64, 61, 74, 61, 20, 77, 69, 6C, 6C, 20, 62, 65, 20, 6C, 571
510 DATA 6F, 73, 74, 2E, D, A, 2F, 52, 20, 3D, 20, 52, 65, 61, 64, 20, 442
520 DATA 6E, 6E, 6C, 6C, 79, 20, 75, 72, 69, 76, 65, D, A, 2F, 4D, 20, 3D, 48C
530 DATA 20, 4D, 69, 6E, 69, 6D, 75, 6D, 20, 64, 69, 73, 6B, 20, 73, 69, 5C3
540 DATA 7A, 65, 20, 28, 31, 36, 4B, 29, D, A, 2F, 41, 20, 3D, 20, 41, 347
550 DATA 6C, 6C, 20, 6F, 66, 20, 61, 76, 61, 69, 6C, 61, 62, 6C, 65, 20, 5AE
560 DATA 65, 78, 70, 61, 6E, 64, 65, 64, 20, 6D, 65, 6D, 6F, 72, 79, D, 60F
570 DATA A, A, 55, 73, 65, 20, 58, 50, 41, 4E, 42, 4F, 53, 53, 20, 74, 463
580 DATA 6F, 20, 63, 6F, 6E, 74, 72, 6F, 6C, 20, 74, 68, 65, 20, 58, 50, 5B9
590 DATA 41, 4E, 44, 49, 53, 4B, 20, 76, 69, 72, 74, 75, 61, 6C, 20, 64, 565
600 DATA 69, 73, 6B, D, A, 24, 41, 50, 43, 20, 50, 72, 6F, 64, 75, 63, 4E3
610 DATA 74, 69, 76, 69, 74, 79, 0, 0, 0, 0, 0, 0, 0, 0, 0, 2A9
620 DATA 0, 0, 0, 0, 0, 0, 0, 0, 44, 72, 69, 76, 65, 20, 24, 3A, 20, 298
630 DATA 64, 6F, 65, 73, 20, 6E, 6F, 74, 20, 62, 65, 6C, 6F, 6F, 67, 20, 5D3
640 DATA 74, 6F, 20, 58, 50, 41, 4E, 42, 4F, 53, 53, 7, D, A, 24, D, 3C0
650 DATA A, 57, 41, 52, 4E, 49, 4E, 47, 3A, 20, 41, 6C, 6C, 20, 63, 75, 4B8
660 DATA 72, 72, 65, 6E, 74, 20, 64, 61, 74, 61, 20, 6F, 66, 20, 24, 3A, 558
670 DATA 20, 77, 69, 6C, 6C, 20, 62, 65, 20, 6C, 6F, 73, 74, 2E, D, A, 4E6
680 DATA 44, 69, 20, 79, 6F, 73, 69, 73, 68, 20, 74, 6F, 20, 63, 591
690 DATA 6F, 6E, 74, 69, 6E, 75, 65, 3F, 20, 20, 59, 2F, 4E, 20, 24, 35, 4F0
700 DATA 4E, 53, 55, 43, 43, 45, 53, 53, 46, 55, 4C, D, A, 24, FC, BA, 53F
710 DATA 3, 1, 28, 9C, 0, BA, 1E, 5C, 0, BA, 3, FE, C8, 79, 4, B4, 6D0
720 DATA 19, CD, 21, 4, 41, 42, 5C, 0, C6, 6, 5D, 0, 24, BA, 26, 3, 47A
730 DATA 8B, F2, 89, 10, 0, B8, 4, 44, CD, 21, BF, 16, 3, F3, A6, 74, 719
740 DATA 11, BA, BB, 3, B8, 6A, 0, B8, 5E, 0, BA, 3E, 3, B8, 61, 0, 665
750 DATA 2B, 25, 8C, 0, 74, B, 88, 2B, 0, 75, 1D, BA, BB, 3, B8, 650
760 DATA 4F, 0, BA, 16, 3, B9, 10, 0, B8, 5, 44, CD, 21, B0, 0, 73, 4F0
770 DATA 8, BA, AF, 3, E8, 3A, 0, B0, 1, 50, BA, BB, 3, B8, 31, 0, 62E
780 DATA 58, B4, 4C, CD, 21, BA, 5F, 3, E8, 26, 0, B8, 1A, 0, BA, 7F, 6AB
790 DATA 3, E8, 1D, 0, 32, E4, CD, 16, 80, FC, 15, 75, A, B4, E, CD, 6A0
800 DATA 10, 32, E4, CD, 16, 3C, D, C3, BA, 37, 3, B8, 3, 0, BA, 5C, 60A
810 DATA 0, B4, 9, CD, 21, C3, 0, 0, 0, 0, 0, 0, 0, 0, 0, 26E
820 DATA 70602

```

**XPANBOSS.BAS:** Running this Basic program creates XPANBOSS.COM, which lets you change the size of XPANDISK dynamically

would not pass the IOCTL message until it found a FAT of the yet-to-be-created drive. Thus, my zero-size-disk approach was abandoned and the 16k minimum drive was born.

## Debugging XPANDISK

Device drivers, like TSRs, are notoriously difficult to debug because they usually have to be installed and active for you to find any lurking problems. So you can't properly debug unless installed; however, you can't load resident code under DEBUG.

One classic way around this dilemma is to isolate a device driver bug by inserting a display statement in the source code at the point where you suspect the problem to be. Print information, such as the value of a register or variable, that you think may lead to resolving the bug.

In the XPANDISK assembly listing there are a few lines of code (shown in lowercase) that are commented out in the INPUT\_OUTPUT procedure. This code is a remnant of XPANDISK's debugging print statements. During development a copy of the print code was inserted in each interrupt procedure to print out the command number of the procedure.

That way I could see which procedures were being called by DOS and in what order they appeared.

The print code left in the listing has been modified and if you make it active, it will print out an asterisk every time the INPUT\_OUTPUT procedure is called. I left it so you could observe how many sector requests were made with every disk access. Try it and count

the asterisks. You'll be surprised how busy the driver is. Warning: if you do use this print technique, don't use DOS display functions 2 (Display Output) and 9 (Print String) for any of the interrupt procedures other than the INIT (initialisation). To do otherwise violates the nonre-entrant taboo of DOS. Instead, print via the BIOS interrupt 10h, function 0Eh (Write TTY). Note too, that the print statement technique can be frustratingly slow and often doesn't

*'Device drivers are difficult to debug because they usually have to be installed and active for you to find any problems.'*

provide enough information to solve many problems.

There is another approach that I've found effective and — more important — faster. Insert an INT 3 instruction in the code at the suspect location. Normally INT 3 points to an IRET instruction. When DEBUG loads, it points INT 3 to its break-point procedure. (Unlike other interrupt instructions that require two bytes to encode, INT 3 is a special interrupt encoded as the single byte, CCh. This enables a debugger to insert the break-point interrupt on top of any single-byte instruction without disturbing adjacent code.)

Once the driver with the embedded INT 3 is installed and DEBUG is loaded, the

stage is set for debugging. The next step is to generate an interrupt to the driver to get to the INT 3. In the case of XPANDISK, the inserted INT 3 was in XPANDISK's IOCTL procedure, so I loaded XPANBOSS into DEBUG and gave DEBUG the 'g' (go) instruction. DEBUG executed XPANBOSS, which called DOS via IOCTL, which called XPANDISK, which tripped over the INT 3, which landed us back in DEBUG in the break-point procedure. DEBUG displayed the value of the registers and the current instruction to be executed, which is INT 3 instruction.

The next instruction after the INT 3 is right in the middle of XPANDISK's resident code and is ready to be traced. (Just be sure to start tracing at the next instruction after the INT 3 instruction.)

XPANDISK should work well with any expanded memory system that sticks to the EMM standard. The DOS *Technical Reference* is an invaluable source if you plan to explore device drivers further. Microsoft's monumental *MS-DOS Encyclopedia* has an excellent section (including some templates) on device drivers, written by Ray Duncan. Another excellent model is the VDISK source code, which is contained on the supplementary disk that comes with DOS 3.x.

While you don't need to use XPANBOSS to reap many of the benefits of XPANDISK, having it on hand ensures that you won't have to reboot because an application runs out of expanded memory. And if you haven't added an expanded memory board yet because you didn't know how you could use it, there's no reason to wait any longer.

END



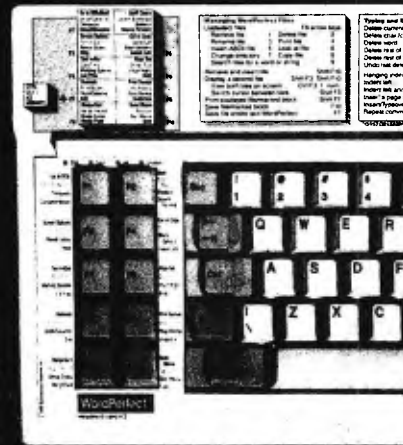


# MICROREF

## QUICK REFERENCE GUIDES & KEYBOARD TEMPLATES

**Find complete software commands and procedures in seconds with the original, best selling reference tool...MICROREF!**

| MICROREF PROGRAM TITLE | QUICK REFERENCE GUIDES | KEYBOARD TEMPLATE KIT |
|------------------------|------------------------|-----------------------|
| PC/MS DOS              | \$34.95                | \$19.95               |
| Lotus 1-2-3            | \$34.95                | \$19.95               |
| Word Perfect 4.2       | \$34.95                | \$19.95               |
| dBase III Plus         | \$44.95                | \$19.95               |
| Multimate Advantage    | \$34.95                | \$19.95               |
| Wordstar 4             | \$34.95                | \$19.95               |
| Word Perfect 5.0       | \$34.95                | \$19.95               |
| Microsoft Word         | \$34.95                | \$19.95               |



Template Kits include Command Strip and Function Key Overlays for both standard and enhanced keyboards.

**INDEX TABS**, logical organization assure fast access to procedures.

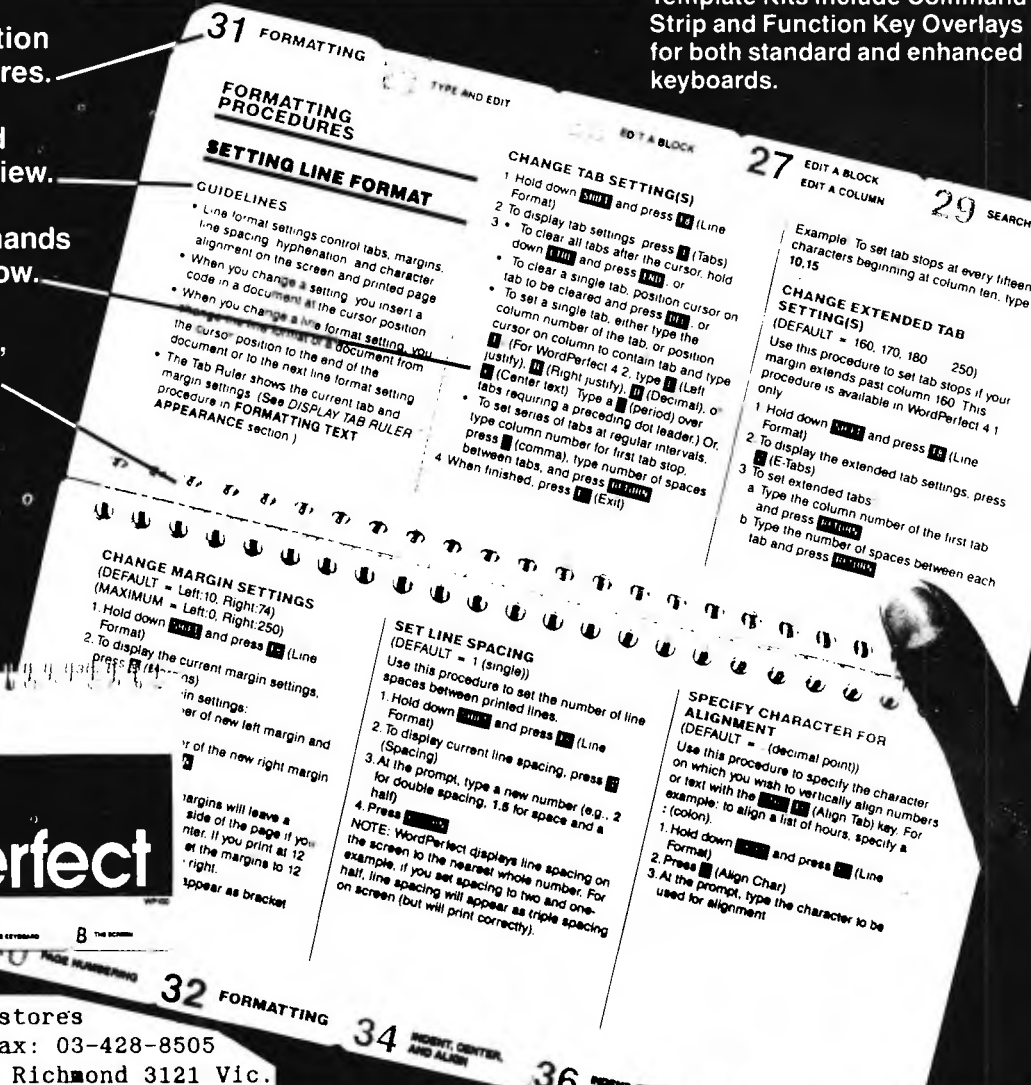
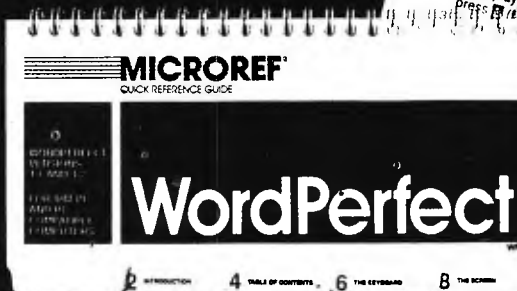
**GUIDELINES**, illustrations and examples aid learning and review.

**STEP-BY-STEP** outline of commands and procedures is easy to follow.

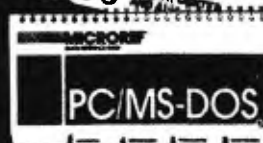
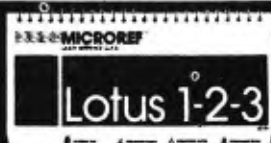
**SPIRAL BOUND** pages lay flat, turn easily. Built-in easel, too.

"Far superior to any other guide, cheat sheet or original documentation. Excellent guide for all users. Highly recommended."

John C. Dvorak, PC Magazine



At computer, software and book stores  
or phone order: 03-429-5611 fax: 03-428-8505  
Step Up Systems 191 Bridge Rd. Richmond 3121 Vic.





## TJ'S WORKSHOP

**APC's monthly pot-pourri of hardware and software productivity tips. APC will pay between \$100 and \$200 for each tip published. Write to TJ's Workshop, APC, 124 Castlereagh Street, Sydney 2000.**

### Two routines for rounding floating-point numbers

• I have developed a simpler approach to the rounding of floating-point numbers than other methods programmers use to solve this problem. The function shown in Fig 1 is contained entirely in a single line and because it does not depend on any tricks or devious string manipulation, its accuracy is immediately apparent by direct inspection.

**A Severdia**

• I have seen many Basic rounding routines, most of which could only be described as horrid. The function shown in Fig 2 is not only shorter and faster, but allows rounding to the nearest fraction.

**G Lawrence**

Judging by the amount of mail we received, it is obvious that rounding is an important subject to a lot of Basic programmers. Both of these routines are indeed very efficient, but I particularly like Mr Lawrence's solution because it is not limited to a given number of places. For example, you could round 102 to the nearest 5, to obtain a result of 100.

Notice that both of these functions should really be written using double-precision variables for the amount. This will ensure as high a degree of accuracy as possible when dealing with very large or small numbers, or when specifying many decimal places. Also, to convert from the number of places to the 'template' variable required by the function in Fig 2, use the formula

**Template = 10<sup>-Places</sup>**

— EW.

### Turbo Pascal's quirky Read function

The program in Fig 3 shows a marked difference between Turbo Pascal ver-

```
Def FnRound(Value, Places) =
  Sgn(Value) * Int(10Places * Abs(Value) + .5) / 10Places
```

Fig 1 A Basic function that rounds a value to any number of decimal places

```
Def FnRound(Amount, Template) =
  Sgn(Amount) * Int(.5 + Abs(Amount) / Template) * Template

'where Template = .01 for 2 decimal places, .05 to round to the
' nearest nickel, or .25 for the nearest quarter.
```

Fig 2 A Basic function that can round to any nearest fraction

```
PROGRAM Reading;
(*Run this under TP3 and TP4 to see the difference*)
VAR
  SArray : array[1..5] of String[255];
  Count : byte;
BEGIN
  FOR Count := 1 to 5 DO Read(SArray[Count]);
  WriteLn;
  WriteLn('You entered the following:');
  FOR Count := 1 to 5 DO WriteLn(Count, ' ', SArray[Count]);
END.
```

Fig 3 The Read procedure has changed in Turbo Pascal 4.0. Run this program in both versions of Turbo Pascal for a demonstration

```
dogcatpigrathog
You entered the following:
1) dog
2) cat
3) pig
4) rat
5) hog
```

Fig 4 The output of the Reading program under Turbo Pascal 3.0

sions 3.0 and 4.0. In the former, a series of separate Read statements could read a series of variables. But the result looked odd (see Fig 4). Nothing happened when you hit Enter, and the variables ended up all mashed together on the screen. Run it under version 3.0 to see the result.

This behavior for Read is not standard Pascal, and version 4.0 has become

```
dog
You entered the following:
1) dog
2)
3)
4)
5)
```

Fig 5 The output of the Reading program under Turbo Pascal 4.0

more standard. In this version, a Read statement doesn't clear the final Enter from the input buffer. Hence, any succeeding Read statements before a ReadLn immediately return a null string without further input (see Fig 5). Run the program under version 4.0 to see the new behavior.

If your programs rely on Read's non-standard behavior, you'll have to

change them to work with version 4.0. The Upgrade program that comes with it can't detect this problem, so you'll have to do it.

**N Rubenking**

## Handling real numbers in Pascal

Turbo Pascal, version 4.0, is stricter than version 3.0 regarding numeric formats. Real numbers can't begin or end with a decimal point now — in version 3.0 you could use '.1' or '65536.'; version 4.0 wants '0.1' and '65536.0'.

In many cases, you can make the change yourself — if you have real number constants in your programs, fix them to conform with the new format. If your input is coming from another system or interactively from the user, you have a problem. You could read the input as a string, then parse it and convert the individual substrings to real numbers using the Val procedure. But Val also requires at least one digit on each side of the decimal point.

Fig 6 demonstrates a new Val procedure that handles numeric strings less strictly. It cleans up input by removing any leading spaces and truncating it at the first internal space it finds. When it's fixed the string, it calls the regular Val procedure and gets access to that procedure by referring to the UNIT — note the call to System.Val. Any time you have identically named procedures in different UNITS, you can distinguish them in this way.

The new Val procedure is more limited than the original — it works only for real numbers. I gave it the same name as the old in order to demonstrate calling using the UNIT name, but in practice you'll probably want to name the new one 'ValR' or something that makes this limitation clear.

**N Rubenking**

## Problems with QuickBASIC's object file formats

In QuickBASIC, versions 2.0 and 3.0, not all compiled .OBJ files are alike. If you've written a subprogram and intend to compile it for inclusion in a user library, Microsoft's documentation states that the subprogram must be compiled as a BRUN.LIB file. If you're working outside of the editing environment, then you would omit the /O option

**QB QBSUB;**

This will create an object file named

```
{ $R-,S+,I+,D+,T-,F-,V+,B+,N-,L+ }
{ $M 16384,0,655360 }
PROGRAM NewValDemo;
VAR
  L : String;
  R : Real;
  C : Integer;

PROCEDURE Val(S : string; VAR result : real; VAR code : integer);
BEGIN
  WHILE (length(S) > 0) AND (S[1] = ' ') DO
    Delete(S,1,1);
  IF pos(' ',S) > 0 THEN
    Delete(S,pos(' ',S),255);
  IF S[1] = '.' THEN S := '0' + S;
  IF S[length(S)] = '.' THEN S := S + '0';
  System.Val(S,result,code);
END;

BEGIN
  Write('Enter a real number:');
  ReadLn(L);
  Val(L,R,C);
  IF C > 0 THEN WriteLn('ERROR at character #',C)
  ELSE WriteLn('You entered ',R:1:11);
END.
```

Fig 6 A more flexible Val procedure for handling real numbers in Turbo Pascal

QBSUB.OBJ that can be included in a user library. But if you later decide to link this file to a main module that was compiled with the BCOM.LIB (/O) option, the resulting program will crash without any indication as to what went wrong.

To correct this, the original subprogram must be *recompiled*, using the BCOM.LIB (/O) option. Because of a primary difference in the two compilation methods, programs that were compiled to use BRUN.LIB cannot be linked to other programs that were compiled for BCOM.LIB.

**R Minutillo**

*This is a particularly insidious problem because most programmers prefer to create a final program that does not require QuickBASIC's runtime support library. Unless a program is very large or is composed of a number of modules that must share common data, it generally makes more sense to use the BCOM.LIB (/O) compile option. But as you observed, this doesn't work for programs that will be added to a user library.*

*This problem has been partially remedied in QuickBASIC 4.0 because that version can create Quick Libraries directly from within the editing environment. Nonetheless, many programmers continue to use their own editor and compile their programs directly from the DOS command line. In those cases, it is important to understand the distinction between the two types of .OBJ files.*

*Also, readers who are still using QuickBASIC 3.0 should be aware of another, equally insidious bug. Many programs that are compiled to a*

*BCOM.LIB file from inside the environment simply will not work. The program will appear to compile and link correctly, but when it is run the computer will simply lock up and die. The solution is to compile outside of the editor, using /O along with any other options that are needed — EW.*

## A BIOS function to monitor and modify keystrokes

On the long list of user complaints about IBM equipment, the Enhanced keyboard has to rank very near the top. Personally, I don't mind the new keyboard layout. I use the CapsLock key more than the Ctrl key when I'm writing code, and the function keys across the top remind me of the old VT terminals. What I don't like is the placement of the Ins key near the Backspace key . . . but the point here is that we all have our gripes.

To solve a problem, I wrote CTRLCAP.COM. This uses one of the advanced BIOS functions that were introduced with the PC AT to monitor and change the key scan codes before they got to the BIOS. Although it was possible, I didn't build in a test to see if the advanced BIOS functions were supported. There's a simpler test. If your computer's BIOS doesn't support the program, it won't work.

Each time a key is pressed or released, the keyboard generates an interrupt 9. This is its way of getting some CPU time to process the keystroke. When a key is pressed, the byte trans-



# This man isn't a computer expert, yet he chose a UNI-X CompuPak kit - and assembled it in one night!



**\$999**

Including tax  
Data at high 18 888  
At this price

**WHY NOT?**



No, he's not a genius, but he's brilliant at spotting great value. Like many of us, he's realized that a personal computer is invaluable, yet the price tag for a professional unit has always been a little beyond his reach. Until now.

Quite simply the UNI-X CompuPak kit contains all the major componentry of a top quality industry standard computer, in an unassembled form. You save the dollars and increase your knowledge, by putting it together yourself.

UNI-X also provide a National Warranty through Honeywell Ltd, a professional network of expert backup and service.

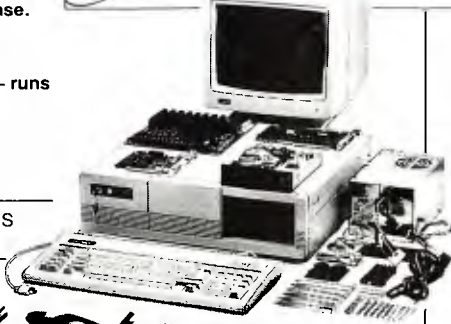
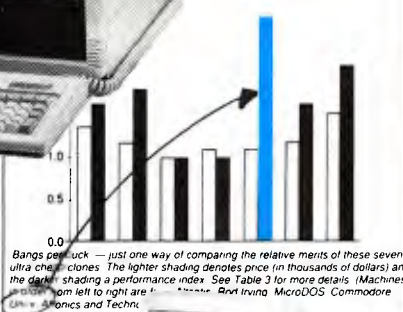
The complete Super 10 kit contains:

- ☐ **Super — 10 mother board** 640K - installed, 4.77/10MHz, plus V-20 chip (very fast!)
- ☐ **Colour graphics adaptor card.**
- ☐ **Multi I/O Card**-Serial/Parallel Ports, Games Port, Clock, calendar, Floppy Controller.

- ☐ **Dual Frequency TTL Monitor** (Green or Amber) includes tilt and swivel base.
- ☐ **Top quality Japanese Disk Drive.**
- ☐ **150 watt switching power supply.**
- ☐ **High tech flip-top case.**
- ☐ **Complete set of accessories.**
- ☐ **AT style keyboard.**
- ☐ **Industry standard — runs all IBM software.**
- ☐ **Assembly manual**
- ☐ **Utility Disk.**
- ☐ **All upgrade options available.**

Ring **PATRICK SIMONIS**  
(07) 356 7866 right now

Bangs per buck



**UNI-X** **CompuPak**

Phone (07) 356 7866  
Dealer enquiries welcome  
Phone (07) 356 8311

UNI-X CompuPak Division, 16-20 Edmondstone St,  
Newmarket, Queensland 4051



## ...and the experts agree with his choice.

Australian Personal Computer have now proved what our customers have known for years

### Processor.

NEC The Uni-X contains a NEC V20, manufactured by Sony. Thus a V20 running at 4.77MHz will outrun an 8088 running at the same clock speed. This claim is substantiated by machines examined provided a standard PC clock rate of 4.77MHz as a minimum, although the Uni-X delivered higher than standard performance even on this clock rate by virtue of the V20. The Atlantis and others machines.

### Performance.

The Uni-X is fastest overall, providing a 50 per cent boost over the Technology Interface due to the V20.

### Display.

The Uni-X is delivered with a nice INTRA tilt/swivel screen. The others are not.

### Cost Effectiveness.

As you might expect, the do-it-yourself Uni-X comes up trumps with its low cost and relatively high performance.

### Specifics.

The Uni-X features a delightfully small motherboard it has employed a VLSI component to replace the Intel 8253 timer, 8255 PPI, 8237 DMA controller and several other components. This reduced the component count and a simplified motherboard serves to reduce costs.

... see for yourself in the full Report in the October '87 issue, or ring us for a copy.

ferred is called a *make code*. When it's released, the corresponding *break code* is sent. Usually, the break code is 80h higher than the make code.

By default, interrupt 9 transfers control to a routine in the BIOS that translates the scan code into an action. This action includes changing a keyboard state, like CapsLock, setting a 'key-pressed' flag, such as Alt, or putting a character in the buffer where applications can access it.

While any program monitoring interrupt 9 could retrieve the scan code, there was no way to change it on its way to the BIOS. To correct this, the AT BIOS was modified to include the function *Keyboard Intercept*. In this case, the BIOS *generates* the interrupt when it gets control, but before the scan code sent from the keyboard is interpreted. The AH register is set to 4Fh, and the scan code is put in AL. A program can chain into this interrupt and set up to monitor data passing through. CTRLCAP does this.

To make the operation of the program clearer, I've listed the assembly source code in Fig 7. (Fig 8 lists a Basic program that will create CTRLCAP.COM.) By examining the code, it's easy to see what's happening. After terminating as a resident program, the program waits to be called by the BIOS. After verifying that AH contains 4Fh, CTRLCAP looks at the scan code. If it finds the make code for the Ctrl key, it substitutes the make code for the CapsLock key. By doing the same for the break code, the BIOS thinks that the key has been switched.

After changes are made, control is passed to the old interrupt in case any programs may have chained in before us. The carry flag is used to communicate the disposition of the scan code to the BIOS. If carry is clear (0), the key is ignored. If the carry flag is set (1), it's processed.

You can determine the make and break codes for any key on the keyboard by using SCAN.COM, which can be created by running the Basic program in Fig 9. Run the program and press any key. The make/break code (in hex) for the key will be displayed on the screen. Note that holding a key down will cause the make code to auto-repeat. Pressing the space bar will exit the program and return to DOS. Because of this, the program cannot be used to find the make/break codes for the spacebar. They are 39h and B9h.

SCAN.COM will allow you to write your own program or change CTRLCAP to exchange any two keys (Ctrl and Alt, for example). You can also use the carry

```

;-----
; CTRLCAP - Reverse the CapsLock and Ctrl key on left side.
; MASM CTRLCAP;
; LINK CTRLCAP;
; EXE2BIN CTRLCAP.EXE CTRLCAP.COM
;-----
CSEG      SEGMENT PARA PUBLIC 'CODE'
          ASSUME  CS:CSEG
          ;Not sure of DS when resident

ENTPT:    JMP      100H      ;SKIP TO END OF THE PSP
          ;COM FILE ENTRY ALWAYS AT 100H

          ;Change these codes to change two other keys
CTRL_DN   EQU      0100H    ;Make for Ctrl
CAP_DN    EQU      03A0H    ;Make for CapsLock

COPYRIGHT DB      "CTRLCAP 1.0 (c) 1988, Ziff Communications Corp,"
          DB      "13,19,"PC Magazine ",254," Robert L. Hummel"

NEW_INT    PROC      FAR
          ;Here is the new interrupt

          PUSHF           ;Save flags
          CMP      AH,04FH ;If Kbd intercept fn
          JE       SWAP_0 ; jump
          POPF          ;Restore flags
          JMP      SHORT SPICE ;Continue to original

SWAP_0:    POPF          ;Discard flags
          PUSH      AX     ;Save scan code
          AND      AL,07FH ;Eliminate high bit

          CMP      AL,CTRL_DN ;If not Ctrl key
          JNE      SWAP_1  ; jump

          POP      AX     ;Restore scan code
          ADD      AL,(CAP_DN-CTRL_DN) ; and change to other value
          JMP      SHORT SWAP_EXIT ;Leave

SWAP_1:    CMP      AL,CAP_DN ;If not CapsLock
          JNE      SWAP_EXIT ; {restore scan code}
          ; then process normal

SWAP_EXIT: SUB      AL,(CAP_DN-CTRL_DN) ; else adjust value

SPICE:     STC           ;Carry on-keep keystroke

OLD_INT    DB      0
          DD      SEAH    ;JMP FAR
          ; old interrupt 15h

NEW_INT    ENDP

;-----
; Initialization Procedure
;-----
INITIALIZE PROC      NEAR
          ASSUME  DS:CSEG
          ;Set by loader.

          MOV      AH,9
          MOV      DX,OFFSET COPYRIGHT
          INT      21H

          MOV      AX,3515H
          INT      21H
          ;Get current interrupt 15h
          ;Result in ES:BX

          MOV      WORD PTR OLD_INT[0],BX ;Save offset
          MOV      WORD PTR OLD_INT[2],ES ;Save segment

          MOV      AX,2515H
          MOV      DX,OFFSET NEW_INT
          INT      21H
          ;Set interrupt 15h
          ;Load DS:DX with our interrupt

          MOV      AX,3100H
          MOV      DX,(OFFSET INITIALIZE-OFFSET CSEG + 15) SHR 4
          INT      21H
          ;Terminate & stay resident

INITIALIZE ENDP

CSEG      ENDS
          END      ENTPT

```

Fig 7 The assembly code listing for the source file CTRLCAP.ASM, which exchanges the action of the CapsLock and Ctrl keys

flag to ignore certain keys, such as PrtSc or Pause.

CTRLCAP is a memory resident program, so the best place to load it is the first line in your AUTOEXEC.BAT

file. It will make the CapsLock key act just like the Ctrl key you're used to. It will also make *both* Ctrl keys act like the CapsLock key, and change the state of the keyboard.

# HACKERS HEAVEN

Dear Computer Hackers,

We know what you want: quality hardware at a hot price, with support when you need it. Well, here it is!

|                                                    |        |
|----------------------------------------------------|--------|
| Toshiba 720Kb 3.5" Floppy Disk Drive               | \$191* |
| Toshiba 1.44Mb 3.5" Floppy Disk Drive              | \$212* |
| Everex Micro Enhancer Delux Ega Video Card [EV659] | \$222  |
| NEC Multisync II Colour Monitor                    | \$1099 |
| * [Includes 5.25" Mounting Frame]                  |        |

## 10MHZ 8088 COMPUTER SYSTEM

- Completely assembled and tested in Australia
- 12 month warranty [Repair centres throughout Australia]
- 10Mhz 8088-2 CPU
- 512 Kbyte Ram
- Small Footprint Chassis
- AT Style Keyboard
- Multi I/O [Serial, Parallel, Clock, Games, Floppy I/O Ports]
- 360 Kbyte Floppy Disk Drive
- Monographics Card [Hercules Compatible]
- 12" Tilt/Swivel based Green or Amber Mono Monitor
- Licensed MS-DOS 3.30A + GWBASIC

Price: \$1,478

## 12MHZ 80286 COMPUTER SYSTEM

- Completely assembled and tested in Australia
- 12 months warranty [Repair centres throughout Australia]
- A fast 12Mhz 80286 CPU
- 640 Kbyte [Up to 4 Mbytes with Ems, on Motherboard!]
- Small Footprint Chassis
- Enhanced 102 Key Keyboard
- 1.2 Mbyte Floppy Disk Drive
- Miniscribe 20 Mbyte Hard Disk Drive
- Monographics Card [Hercules Compatible]
- 12" Green or Amber Monitor with Tilt/Swivel Base
- Licensed MS-DOS 3.30A + GWBASIC

Price: \$2,700

## TOSHIBA LAP TOP COMPUTERS

T1000, T1200FB, T1200HB, T1600, T3200, T5100, T5200... CALL

## ADD-ON CARDS

|                                                        |       |
|--------------------------------------------------------|-------|
| • XT Motherboard, 10Mhz, Bios, No Ram                  | \$180 |
| • AT Motherboard, 12Mhz, Bios, No Ram                  | \$660 |
| • XT 2 Mb EMS Ram Card, No Ram                         | \$160 |
| • AT 2 Mb EMS/Extended Ram Card, No Ram                | \$229 |
| • XT Hard Disk Controller [Western Digital]            | \$160 |
| • AT Hard + Floppy Controller [WD]                     | \$250 |
| • AT ESDI Hard Disk Controller [WD]                    | \$394 |
| • Monographics Card with Printer Port                  | \$120 |
| • Everex Enhanced EGA Card [640 x 480]                 | \$222 |
| • Everex VGA Card [800 x 600]                          | \$539 |
| • XT I/O, 2 Serial, Parallel, Clock, Games, Floppy I/O | \$130 |
| • XT I/O, 2 Serial, Parallel, Clock & Games Ports      | \$136 |
| • AT I/O, 2 Serial, Parallel, & Games Ports            | \$125 |
| • AT Quad Port Serial Card                             | \$238 |
| • XT Standard Floppy Controller                        | \$50  |
| • XT 3.5" & 5.25" Floppy Controller                    | \$130 |

## FLOPPY DISK DRIVES

|                                          |       |
|------------------------------------------|-------|
| • Chinon 360 KB 5.25" Floppy Disk Drive  | \$162 |
| • Chinon 1.2 MB 5.25" Floppy Disk Drive  | \$210 |
| • Toshiba 720 KB 3.5" Floppy Disk Drive  | \$191 |
| • Toshiba 1.44 MB 3.5" Floppy Disk Drive | \$212 |

## HARD DISK DRIVES

|                                                                |        |
|----------------------------------------------------------------|--------|
| • Miniscribe 8425, 20 MB, 68 MS HDD                            | \$399  |
| • Miniscribe 3650, 42 MB, 61 MS HDD                            | \$593  |
| • Miniscribe 3675, 60 MB RLL, 61 MS HDD                        | \$704  |
| • Miniscribe 1050, 44 MB, 28 MS HDD                            | \$974  |
| • Miniscribe 3085, 71 MB, 25 MS HDD                            | \$1588 |
| • Miniscribe 6085, Full Height, 71 MB, 28 MS HDD               | \$1230 |
| • Miniscribe 6128, Full Height, 112MB RLL, 28 MS HDD           | \$1656 |
| • And many larger size ST506, SCSI, and ESDI Drives available. |        |

## MONITORS

|                                        |        |
|----------------------------------------|--------|
| • 12" TTL Mono, Tilt/Swivel Base       | \$165  |
| • 14" Dual Scan Mono, Green or Amber   | \$251  |
| • 14" CGA, 0.42 MM DOT, Colour Monitor | \$470  |
| • 14" EGA, 0.31 MM DOT, Colour Monitor | \$859  |
| • 14" Multiscan Colour Monitor         | \$1042 |
| • NEC Multisync II [800 x 560 Pixels]  | \$1099 |

## PRINTERS

|                                               |        |
|-----------------------------------------------|--------|
| • OKI ML182P, 120 CPS, 9 PIN, 80 Column       | \$371  |
| • OKI ML183P, 120 CPS, 9 PIN, 136 Column      | \$675  |
| • OKI ML192P, 240 CPS, 9 PIN, 80 Column       | \$675  |
| • OKI ML193P, 240 CPS, 9 PIN, 136 Column      | \$844  |
| • OKI Laserline 6, 6 PPM, Laser Printer       | \$2954 |
| • Toshiba P321SL, 216 CPS, 24 PIN, 80 Column  | \$996  |
| • Toshiba P341SL, 216 CPS, 24 PIN, 136 Column | \$1290 |

## MISCELLANEOUS

|                                                 |         |
|-------------------------------------------------|---------|
| • 41256-12 256K 120NS Dynamic Ram               | \$17.90 |
| • 4164-12 64K 120NS Dynamic Ram                 | \$5.90  |
| • 4464-12 4 x 64K 120NS Dynamic Ram             | \$24    |
| • 41C1000-10 1M 100NS Dynamic Ram               | \$59    |
| • Maths Coprocessors                            | CALL    |
| • RS232 Cables: Male-Female, M-M, & 9 to 25 PIN | \$18    |
| • Parallel Printer Cable                        | \$18    |
| • 2 Way Serial Data Switch                      | \$42    |
| • 4 Way Serial Data Switch                      | \$58    |
| • 4 Way Parallel Data Switch                    | \$58    |
| • 84 Key Keyboard for AT or XT                  | \$72    |
| • 102 Key Keyboard for AT or XT                 | \$99    |
| • 150 Watt Standard XT Power Supply             | \$120   |
| • 200 Watt Standard AT Power Supply             | \$199   |
| • 3 Button Serial Mouse with Software           | \$84    |
| • Schmidt Intelligent V21, V22, V23 Modem       | \$450   |

**NOTE: ALL PRICES INCLUDE SALES TAX. ERRORS AND OMISSIONS EXCEPTED. FREIGHT EXTRA**

P.O. BOX 748, ARTARMON, N.S.W., 2064

**PHONE [02] 427-0411**



## A correction regarding the COMSPEC environment variable

In TJ's, June 1988, you explained setting the COMSPEC environment variable. The text, however, contained an error. You listed

```
SET COMSPEC=C:\
```

when you should have listed

```
SET COMSPEC=C:\COMMAND.COM
```

If you don't list the name of the file in the COMSPEC, you're just as bad off as if you had named an invalid drive. DOS will never be able to load COMMAND when it needs it again.

**W Bonner**

*Leaving the name of the command*

processor out of the COMSPEC variable was an error. I apologise for any inconvenience this may have caused readers — Ed.

## Using DEBUG on any nontext files

Debugging programs is an arcane art, one best practised by those who write the programs in the first place. But the DEBUG.COM utility that came with your DOS package is good for much more than debugging. Its secondary purpose is to 'load, alter, or display any file', and you can use it for that purpose without learning to add 84E7 and 02CF.

Clearly you can alter or display a text file with a word processor. DEBUG is generally used with programs and other nontext files. Using DEBUG you can scan an unknown program looking for suspicious messages like 'Arf! Arf! Gotcha!' or change program messages

to suit your preference. I'll demonstrate both techniques below.

### Finish with a beep

Formatting a disk can take a couple of minutes, long enough that you don't want to sit and watch for it to finish. Wouldn't it be nice if FORMAT would beep to say it's done? With DEBUG you can change the final 'Format another (Y/N)?' message to include a special character that will beep the speaker.

Whatever version of DOS you have, you can work out the patch to FORMAT.COM by using the following technique. You will use the DEBUG commands Register, Search, Dump, Enter, Write, and Quit. To give DEBUG a command, simply type the first letter, type any parameters, and then press Return. Fig 10 displays both the user commands and DEBUG's responses for the whole procedure. Do note that the size and addresses in the figure will not necessarily match those on your system.

First, make a copy of FORMAT.COM and name it, say, FORMATX.COM.

When you're patching a file in DEBUG, always do it on a copy! Make sure that DEBUG is available either in the current directory or on the PATH. Then load FORMATX.COM into DEBUG with the command

**DEBUG FORMATX.COM**

You'll get a dash prompt, nothing more. DEBUG doesn't have a help key.

The first thing you need to do is find out how many bytes are in the program. When DEBUG loads a program, it stores the program's size in the CX register. Some DEBUG commands can cause this value to change — check it immediately after starting DEBUG using the command

**RCX**

On the next line, you will see CX followed by a four-digit number. Make a

```
100 REM - BASIC PROGRAM TO CREATE CTRLCAP.COM
110 CLS:PRINT "Creating CTRLCAP.COM": OPEN "CTRLCAP.COM" AS #1 LEN = 1
120 FIELD #1, 1 AS A$: CHECKSUM#=0
130 FOR I = 1 TO 10
140   LINE$=0: LOCATE 2,3: PRINT "Countdown: "; 10 - I
150   FOR J = 1 TO 16: READ BYTE$: CHECKSUM# = CHECKSUM# + VAL("&H"+BYTE$)
160   LINE$ = LINE$ + VAL("&H"+BYTE$)
170   IF (BYTE$ < 256) THEN LSET A$ = CHR$(VAL("&H"+BYTE$)): PUT #1, J
180 NEXT J
190 READ LINETOT$: LINECHECK# = VAL("&H"+LINETOT$)
200 IF LINECHECK# = LINE$ THEN GOTO 220
210 LOCATE 4,2: PRINT "Error in line #"; 260 + 10 * I: GOTO 260
220 NEXT I
230 CLOSE: READ FILETOT$: FILECHECK# = VAL(FILETOT$)
240 IF CHECKSUM# <> FILECHECK# THEN GOTO 260
250 PRINT: PRINT "CTRLCAP.COM created successfully": SYSTEM
260 PRINT: PRINT "CTRLCAP.COM is not valid!": END
270 DATA 72, 43, 54, 52, 4C, 43, 41, 50, 20, 31, 2E, 30, 20, 20, 63, 4C0
280 DATA 29, 20, 31, 39, 30, 38, 2C, 20, 5A, 69, 66, 66, 20, 43, 6F, 6D, 43D
290 DATA 6D, 75, 6E, 63, 61, 74, 69, 6F, 6E, 73, 20, 43, 6F, 72, 70, 65E
300 DATA 2E, D, A, 50, 43, 20, 4D, 61, 67, 61, 7A, 69, 6E, 65, 20, FE, 542
310 DATA 20, 52, 6F, 62, 65, 72, 74, 20, 4C, 20, 20, 40, 75, 6D, 6D, 65, 544
320 DATA 6C, 9C, 88, FC, 4F, 74, 3, 9D, EB, 15, 9D, 50, 24, 7F, 3C, 1D, 6D0
330 DATA 75, 5, 58, 4, 1D, EB, 7, 3C, 3A, 50, 75, 2, 2C, 1D, F9, EA, 556
340 DATA 0, 0, 0, 0, B4, 9, BA, 2, 1, CD, 21, B0, 15, 35, CD, 21, 458
350 DATA 09, 1E, 70, 1, 8C, 6, 72, 1, B8, 15, 25, BA, 51, 1, CD, 21, 500
360 DATA B0, 0, 31, BA, 10, 0, CD, 21, 0, 0, 0, 0, 0, 0, 0, 0, 2A0
370 DATA 12017
```

Fig 8 A Basic program that will automatically create CTRLCAP.COM

```
100 REM -- BASIC PROGRAM TO CREATE SCAN.COM
110 OPEN "SCAN.COM" AS #1 LEN = 1
120 FIELD #1, 1 AS A$
130 CHECKSUM = 0
140 FOR I = 1 TO 15
150   LINE$ = 0
155   PRINT " ":
160   FOR J = 1 TO 8
170     READ BYTE
180     CHECKSUM = CHECKSUM + BYTE
190     LINE$ = LINE$ + BYTE
200     IF (BYTE < 256) THEN LSET A$ = CHR$(BYTE)
210     PUT #1, J
220   NEXT J
230   READ LINECHECK
240   IF LINECHECK <> LINE$ THEN PRINT "Error in Line"; 200 + 10 * I
250 NEXT I
260 CLOSE

270 IF CHECKSUM = 10857 THEN PRINT "Complete": END
280 PRINT "COM file is not valid": END
290 DATA 235, 5, 0, 0, 0, 0, 0, 184, 424
300 DATA 9, 53, 205, 33, 137, 30, 2, 1, 470
310 DATA 140, 6, 4, 1, 186, 49, 1, 184, 574
320 DATA 9, 39, 205, 33, 128, 62, 6, 1, 401
330 DATA 0, 116, 249, 197, 22, 2, 1, 104, 771
340 DATA 9, 37, 205, 33, 184, 0, 76, 205, 749
350 DATA 33, 251, 80, 220, 96, 60, 57, 117, 322
360 DATA 0, 46, 254, 6, 6, 1, 235, 4, 560
370 DATA 144, 50, 220, 232, 21, 0, 220, 97, 1000
380 DATA 130, 224, 12, 128, 230, 97, 138, 106, 1163
390 DATA 230, 97, 250, 176, 32, 235, 8, 230, 1250
400 DATA 32, 0, 207, 0, 0, 177, 4, 210, 079
410 DATA 232, 89, 232, 3, 0, 88, 36, 14, 600
420 DATA 4, 144, 39, 20, 64, 39, 180, 14, 500
430 DATA 205, 16, 190, 0, 0, 0, 0, 0, 416
```

Fig 9 A Basic program to create SCAN.COM

# MicroGram COMPUTERS

## DATA SWITCH BOXES

Manual AB and ABCD Switch

- \* Share one printer/plotter with multiple computers
- \* Switch one computer to multiple printers etc.

|                   |         |
|-------------------|---------|
| Two way parallel  | \$65.00 |
| Four way parallel | \$75.00 |
| Two way serial    | \$65.00 |
| Four way serial   | \$75.00 |

Manual Crossover Switch

- \* Share (cross over) two computers with two printers \$75.00

Automatic AB and ABCD Switch

- \* Automatically switch output from multiple computers to one printer
- |                   |          |
|-------------------|----------|
| Two way parallel  | \$120.00 |
| Four way parallel | \$170.00 |

## 8 BIT A/D - D/A CARD

- \* 64 8 bit A/D channels.
  - \* 2 8 bit D/A channels.
  - \* 24 digital I/O lines programmable as input or output.
  - \* 3 independent 16 bit counters.
- \$349.00**

Also available:

|                  |          |
|------------------|----------|
| 12 bit A/D - D/A | \$305.00 |
| 14 bit A/D - D/A | \$430.00 |
| 16 bit A/D - D/A | \$480.00 |

## DIGITAL I/O CARD

- \* 48 Digital I/O lines programmable as input or output.
  - \* 16 channels have LED status display.
  - \* 3 independent 16 bit counters.
- \$135.00**

## LASER PRINTER

### MEMORY EXPANSION

- \* Memory Expansion Kit for HP Laserjet Series II, Canon LBP-811 and Olivetti PG-208.
  - \* Add 1Mb, 2Mb or 4Mb of memory.
  - \* Ideal for Desktop Publishing
- |         |          |
|---------|----------|
| 0kb RAM | \$250.00 |
|---------|----------|

## XENIX 4 PORT SERIAL CARD

- \* Four standard asynchronous serial ports.
  - \* I/O port address sectable by DIP switch in 7 different groups.
  - \* Three cards may be installed.
  - \* XENIX driver included **\$325.00**
  - \* 8 Port card also available.
- \$695.00**

## AT Diagnostic Card

- \* Plug into motherboard expansion slot and switch on.
- \* Error code is shown on LED display indicating failure of one of 59 possible tests.
- \* Where appropriate the manual indicates the area of circuitry and/or the suspect IC associated with the error code. **\$285.00**

## BAR CODE READERS

- \* Keyboard interface (connects between keyboard and computer).
- \* Bidirectional scanning.
- \* Will read most barcode standards e.g. UPC / EAN / JAN / Code 39 / Interleaved 2 of 5.
- \* Barcode printing software included. **\$450.00**

## IC TEST CARD - NEW VERSION

- \* Tests 54/7400, CD45/4000 and MC145/140 series chips.
- \* Tests 4164, 41256 and 41416 DRAM chips.
- \* Will identify unknown chips from library.
- \* LOGIC LIBRARY USER UPGRADEABLE.
- \* Add logic functions to the library for new chips or custom PAL, FPLA, PROM etc. **\$280.00**

## EPROM WRITER CARD

- \* Programs 2716, 2732, 2732A, 2764, 2764A, 27128, 27128A, 27256, 27356A, 27512, 27512A.
- \* Read EPROMS and save to disc.
- \* Read from disk and write to EPROM.
- \* Modify EPROM.
- \* Blank check.

|               |          |
|---------------|----------|
| Single burner | \$190.00 |
| Four burner   | \$360.00 |
| Eight burner  | \$525.00 |

## NETWORKING CARDS AND SOFTWARE

- \* Network up to 64 computers
- \* Supports file locking with single user software
- \* Supports record locking with multi-user software
- \* Network software uses familiar DOS commands
- \* Shares all file server hard and

floppy disk drives

- \* Shares printers anywhere on the network and allows re-direction with popup utility
- |          |                   |
|----------|-------------------|
| 1Mb/sec  | \$495.00 per card |
| 10Mb/sec | \$825.00 per card |

## EEMS CARDS

- \* Capacity 2Mb per card, 4 cards per system
  - \* Will backfill conventional memory to 640kb.
  - \* Compatible with EMS and EEMS memory to run with Lotus 1-2-3, DESQview II etc.
  - \* Driver software included as well as print buffer and RAM disk utilities.
  - \* XT or AT versions
- |         |          |
|---------|----------|
| 0kb RAM | \$230.00 |
|---------|----------|

## COM2 SERIAL KITS

- \* Chip set: 8250, 1488, 1489.
- \* Cable: 26 pin, single 10 pin or 2 by 5 pin to back plane 25 pin D connector. **\$25.00**

## MI-KI MICE

- \* MD-7: 3 button, PC Mouse Systems Mouse compatible **\$89.00**
- \* MD-M7: 2 button, Microsoft Mouse compatible **\$95.00**
- \* MD-11: 3 button Microsoft/Mouse Systems Mouse compatible. (Auto/pushbutton select) **\$120.00**
- \* MD-20: 3 button Microsoft/Mouse Systems/Logitech mouse compatible. (Auto/pushbutton/software/jumper select). Pop-up menu software included. **\$160.00**

## HANDY SCANNER

- \* Scan drawings, photos, logos, letter heads etc. into your computer.
- \* 200 dpi resolution.
- \* B/W and 3 half tone scan settings.
- \* Contrast adjustment.
- \* Save scanned graphic in MS Windows, PC Paintbrush, Dr. Halo and GEM formats.
- \* Halo DPE software and manual included free of charge. **\$525.00**

**All prices include Sales Tax.**

**Fax: (043) 34 1334**

**Phone: (043) 328 651**

**17 Barry Street, Bateau Bay NSW 2261**

**Dealer Enquiries Welcome**

**Bankcard VISA**

```
C:\DOS>DEBUG FORMATX.COM
-RCX
CX 2D60
:
-S CS:100 L 2D60 'Format another'
46E2:2185
-D 46E2:2185
46E2:2180      46 6F 72-6D 61 74 20 61 6E 6F 74      Format anot
46E2:2190  68 65 72 20 28 59 2F 4E-29 3F 00 49 6E 73 65 72  her (Y/N)?.Inser
46E2:21A0  74 20 44 4F 53 20 64 69-73 6B 20 69 6E 20 64 72  t DOS disk in dr
46E2:21B0  69 76 65 20 25 63 3A 0D-0A 61 6E 64 20 73 74 72  ive %c:...and str
46E2:21C0  69 6B 65 20 45 4E 54 45-52 20 77 68 65 6E 20 72  ike ENTER when r
46E2:21D0  65 61 64 79 0D 0A 00 52-65 2D 69 6E 73 65 72 74  eady...Re-insert
46E2:21E0  20 64 69 73 6B 65 74 74-65 20 66 6F 72 20 64 72  diskette for dr
46E2:21F0  69 76 65 20 25 63 3A 00-56 6F 6C 75 6D 65 20 6C  ive %c:.Volume 1
46E2:2200  61 62 65 6C 20      abel
-E 46E2:2185 'Format another'07
-D 46E2:2185
46E2:2180      46 6F 72-6D 61 74 20 61 6E 6F 74      Format anot
46E2:2190  68 65 72 07 28 59 2F 4E-29 3F 00 49 6E 73 65 72  her (Y/N)?.Inser
46E2:21A0  74 20 44 4F 53 20 64 69-73 6B 20 69 6E 20 64 72  t DOS disk in dr
46E2:21B0  69 76 65 20 25 63 3A 0D-0A 61 6E 64 20 73 74 72  ive %c:...and str
46E2:21C0  69 6B 65 20 45 4E 54 45-52 20 77 68 65 6E 20 72  ike ENTER when r
46E2:21D0  65 61 64 79 0D 0A 00 52-65 2D 69 6E 73 65 72 74  eady...Re-insert
46E2:21E0  20 64 69 73 6B 65 74 74-65 20 66 6F 72 20 64 72  diskette for dr
46E2:21F0  69 76 65 20 25 63 3A 00-56 6F 6C 75 6D 65 20 6C  ive %c:.Volume 1
46E2:2200  61 62 65 6C 20      abel
-W
Writing 2D60 bytes
-Q
```

Fig 10 This is an example of patching FORMAT.COM. You type in the italicised items

note of the number and hit the Return key. It is a hexadecimal number, so it may contain the letters A through to F in addition to Arabic numerals. To locate the message in the program, use the Search command

```
S CS:100 L #### 'Format
another'
```

where #### is the number you noted. CS:100 means the beginning of the program; we want to search from the beginning. L #### indicates the length of the area to search — in this case, the whole program. The character string in single quotes is the object of our search.

Make a note of the address returned by Search; it will be two hexadecimal numbers separated by a colon (46E2:2185, for example). Display the bytes at that address using the Dump command

```
D ####:####
```

where ####.#### is the address you got. The result will be a three-column display like that in the middle of Fig 10.

The first column contained an address, and the wide middle column lists 16 bytes starting at that address. The last column shows the characters corresponding to those bytes. You should see the 'Format another' message there.

You'll insert the changed message with the Enter command

```
E ####:#### 'Format another' 07
```

E ####.#### says you're entering new bytes at the address you noted. The

new bytes consist of the same message as before followed by the byte 07. Instead of a space between 'Format another' and '(Y/N)?' you now have a BEL character. Writing this character causes the speaker to beep.

To confirm that the change was successful, Dump the data again

```
D ####:####
```

using the same address. In the last column, you'll see a period after 'another': DEBUG represents all non-printable characters with a period. Find the corresponding byte in the middle

```
ECHO OFF
CLS
IF "%1" == "" GOTO HELP
ECHO The file %1 is about to be permanently deleted!!
ECHO to exit press [CTRL-BREAK] or
PAUSE
DEL %1
COPY WIPE.DAT %1 > NUL
DEL %1
ECHO %1 deleted
GOTO END
:HELP
ECHO To permanently delete a file, type
ECHO      WIPE name
ECHO Where name is the file you wish to wipe
:END
```

Fig 11 WIPE out files to help prevent the possibility of unerasing

```
This file has been wiped....^G^G^G
```

Fig 12 The possible contents of a WIPE.DAT file. ^G represents Ctrl-G

column and you'll see that it's 07.

Assuming all went well, you're ready to finish by entering

W  
Q

W writes the file back to disk; Q quits. Now you have a copy of FORMAT.COM that will beep after it formats a disk.

When you use DEBUG to change messages, remember that the new message must never be longer than the old. A longer message will overwrite the next part of the program, very likely causing it to crash. Note also that DEBUG will not Write changes to an .EXE file. That's no big problem: just rename the file to some other extension while you're modifying it.

## What's in a file?

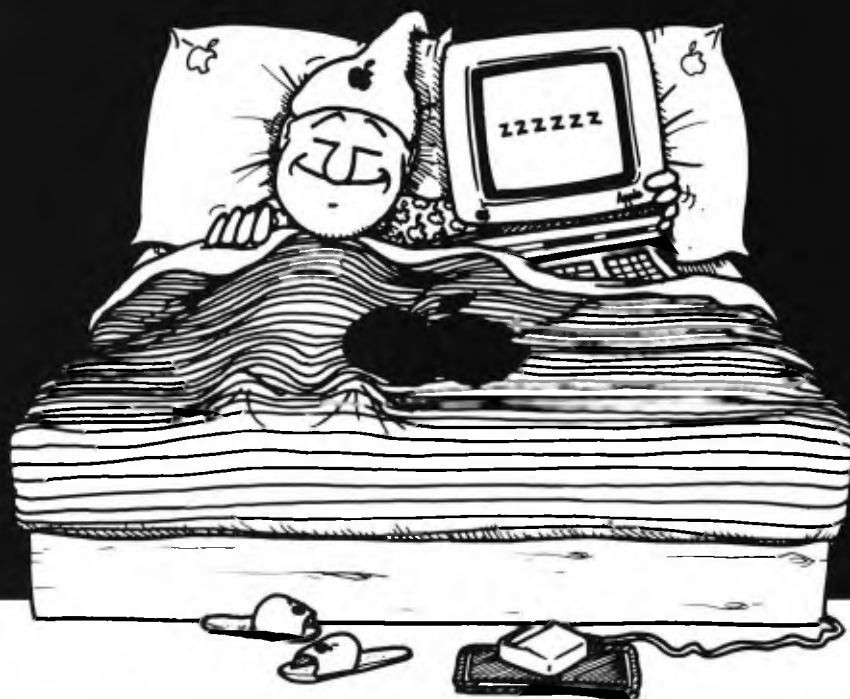
You used the Dump command to look at the message in FORMAT.COM. Dump can, however, display any part of any file. Pure program code looks like gibberish when you Dump it, but often there are text messages embedded in the code.

To look at the contents of a file, load it into DEBUG from the command line. Check the length of the file with the RCX command, just as in the previous example. Now give the command

```
D CS:100 L ####
```

where #### is the file size from RCX. The contents of the file will scroll past on the screen. You can stop the scrolling temporarily with the Ctrl-S or Ctrl-NumLock key and start it again with any





# At Computer Knowledge we sleep, eat and breathe Apple computers.

*So if you are thinking about purchasing your first computer,  
or upgrading your existing Apple system, consider this . . .*

Choosing your first computer is not easy. Neither is making the right choices when it comes to upgrading your current system. There seems to be as much technical jargon as there are brands of computers, all claiming to be the biggest and best for your needs.

That's why at Computer Knowledge we have only Apple computers. Nothing else. That's because we believe Apple computers can match it with the world's best in terms of

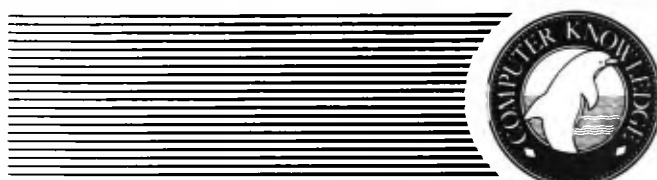
power, versatility and suitability while at the same time being incredibly easy to operate.

At Computer Knowledge we like to think that we are as easy to understand as Apple computers, so before you make your decisions telephone or call in and see us for professional and helpful advice, the full range of Apple hardware, software, peripherals and service back-up.

## HARDWARE • SOFTWARE • PERIPHERALS • SERVICE

Armadale . . . . . 1131 High St. . . Ph: 822 8767  
 Dandenong . . . . . Cnr. Scott & Thomas Sts. . . Ph: 791 2900  
 Footscray . . . . . Cnr. Victoria & Charles Sts. . . Ph: 689 8755  
 Geelong . 3/75 High St. (Cnr. Mt. Pleasant Rd.) . Ph: (052) 44 3255  
 Ivanhoe . . . . . 66 Upper Heidelberg Rd. . . Ph: 497 1044  
 Port Melbourne . Suite 2, Cnr. Beach & Dow Sts. . . Ph: 646 4077

## COMPUTER KNOWLEDGE



Apple Authorised Reseller

```
ECHO OFF
CLS
IF "%1" == "" GOTO HELP
ECHO Files matching %1 are about to be permanently deleted!!
ECHO To exit press [CTRL-BREAK] or
PAUSE
ECHO This file has been wiped... > WIPE.DAT
FOR %%f IN (%1) DO COPY WIPE.DAT %%f > NUL
DEL WIPE.DAT
DEL %1
ECHO %1 deleted
GOTO END
:HELP
ECHO To permanently delete a file or set of files, type
ECHO      "WIPE filespec"
ECHO ...where filespec may contain wildcards.
:END
```

Fig 13 WIPE2.BAT, a version of WIPE.BAT, works with wildcards

other key. You can also end the display with Ctrl-C or Ctrl-break.

If you want to study every byte, you can dump just eight lines at a time. You won't have to press Ctrl-S to stop the

display, but you will have to enter the D command after each eight lines. To do it this way, start with the command

D CS:100

As you finish looking at a block of bytes, give the Dump command again with no parameters — D alone. Note that it's up to you to know when to stop. Watch the second half of the address in the first column. When it reaches the file size, you have four more Dumps to go until the end of the file.

## Debug — a useful tool

Don't think of DEBUG as a debugger — it can't compare to modern tools like CodeView. Think of it as a byte-level file editor. Its command language is a bit awkward, but the price is right.

## Protecting from file recovery programs

Deleting a file does not remove it from the disk. A utility program like PC Tools or The Norton Utilities can unerase the file. For true disk security, the disk sectors that the file occupied must be written over. However, barring that, there is a way to make it very difficult to unerase

```

{SR+,-C-}
PROGRAM PageDemo;
TYPE
  String80 = STRING[80];
  Regpack = RECORD
    CASE Integer OF
      1:(AX,BX,CX,DX,BP,SI,DI,DS,ES,Flags : Integer);
      2:(AL,AH,BL,BH,CL,CH,DL,DH : Byte);
    END;
  VAR
    Regs : RegPack;
    Data : String80;
    I, J : Integer;
    dummy : Char;

  PROCEDURE Setpage(page : Byte);
  { Sets the current displayed page using INT 10h. All "Writes" }
  { still goes to page 0 -- this procedure just changes which }
  { page is visible. }
  BEGIN
    Regs.AH := 5;
    Regs.AL := page;
    Intr($10, Regs);
  END;

  PROCEDURE ClrPage(Page, Background : Byte);
  { Clears the page using INT 10h services to write spaces }
  { over the whole page. }
  BEGIN
    WITH Regs DO
      BEGIN
        (** Locate cursor first **)
        DL := 0; { Column }
        DH := 0; { Row }
        BH := Page; { Page }
        AH := 2; { Set Cursor Position }
        Intr($10, Regs);
        (** Now write characters **)
        AH := 9; { Write Char w/ attr. }
        BH := Page; { Page }
        BL := Background*16; { attribute byte }
        AL := Ord(' '); { Char to write }

        CX := 2000; { # of times to write }
        Intr($10, Regs);
      END;
    END;

  PROCEDURE PutPage(VAR Data : String80; Page, Col, Row, Back, Fore : Byte);
  { Uses INT 10h to write a string to the selected page. }
  { Arguments are: }
  { 1) A String[80] to write }
  { 2) the Page to Write to }
  { 3) the Column To Start at }
  { 4) the Row To Write in }
  { 5) the Background Color }
  { 6) the Foreground Color }
  VAR
    Endcol : Byte;
    L, I : Integer;

```

```
BEGIN
Col := Col-1; {Turbo uses 1..80, BIOS uses 3..79}
Row := Row-1; {Turbo uses 1..25, BIOS uses 0..24}
IF (Col < 0) OR (Col > 79) THEN Col := 0;
IF (Row < 0) OR (Row > 24) THEN Row := 0;
IF (Page < 0) OR (Page > 3) THEN Page := 0;
L := Length(Data);
EndCol := Col+L;
IF EndCol > 79 THEN
    BEGIN
        EndCol := 79;
        L := EndCol-Col;
    END;
FOR I := 0 TO (L-1) DO
    BEGIN
        WITH Regs DO
            BEGIN
                { ** Locate Cursor First ** }
                DL := Col+I;      { Column          }
                DH := Row;       { Row            }
                BH := Page;     { Page           }
                AH := 2;         { Set Cursor Position }
                Intr($10, Regs);

                { NOW Write Character }
                AH := 9;         { Write Char w/ attr. }
                BH := Page;     { Page           }
                BL := Back*16+Fore; { attribute byte   }
                AL := Ord(Data[I+1]); { char to write   }
                CX := 1;         { # of times to write }
                Intr($10, Regs);

            END;
        END;
    END;
END;

BEGIN
WriteLn('WARNING: ONLY works on color/graphics system. ');
FOR J := 1 TO 3 DO
    BEGIN
        Data := 'Data Data Data Data Data Data Data Data ' +
               'Data Data Data Data Data Data Data Data ' +
               'Data Data Data Data Data Data Data Data ';
        WriteLn('Building Page ', J);
       ClrPage(J, J);
        FOR I := 1 TO 24 DO
            PutPage(Data, J, 1, I, J, White);
        Data := 'Press any key to continue...';
        PutPage(Data, J, 1, 25, White, J);
    END;
    WriteLn('Press key for first page'); Read(Kbd, dummy);
    setpage(1); Read(Kbd, dummy);
    setpage(2); Read(Kbd, dummy);
    setpage(3); Read(Kbd, dummy);
    setpage(0); WriteLn('We're back!'); {Read(Kbd, dummy);}
END.
```

*Fig 14 A program for writing to and displaying all of the CGA's video pages*

# FMS

## 'Tools for the professional'



### QB/Pro Volume 3 — Enhanced Shell Facility

If you are using BASCOM QuickBASIC or the Microsoft Business BASIC Compiler, the SHELL statement is now officially obsolete! SuperSHELL offers you much more in terms of memory usage, functionality, features, and control. When you invoke SuperShell, your entire program is "swapped" to disk (or to EMS memory for faster reloading), returning all but 6K of memory to your control!

### QB/Pro Volume 4 — Concurrent Processing

Further Quickbasic library routines building upon the routines available in Mach 2 Toolbox for: Display and keyboard, Background printing, Mouse functions, Open extra files.

| QUICK BASIC LANGUAGE TOOLS: |           |       |
|-----------------------------|-----------|-------|
| Graphpack                   | Crescent  | \$135 |
| Mach 2                      | Microhelp | \$165 |
| ToolBox                     | Microhelp | \$165 |
| Stay Res                    | Microhelp | \$165 |
| Stay Res Plus               | Microhelp | \$195 |
| QB Pro Series (Per Volume)  | Microhelp | \$150 |
| Panel                       | Lattice   | \$395 |
| Btrieve                     | Novell    | \$185 |

| QUICK C LANGUAGE TOOLS: |                   |       |
|-------------------------|-------------------|-------|
| Greenleaf C Sampler     | Greenleaf         | \$175 |
| Panel/Quick C           | Lattice           | \$195 |
| Halo 88                 | Media Cybernetics | \$525 |
| Btrieve                 | Novell            | \$185 |

## Mach 2

Advanced Assembly Subroutines Library for Compiled BASIC Save hours and hours of programming time, make your programs run much faster, give your programs that crisp, "professional" look and feel, and have smaller EXE programs. No knowledge of assembly language is needed, nor is an assembler program required in order to use Mach 2.

## The MicroHelp Toolbox

The MicroHelp Toolbox is a collection of Subprograms and functions for use with QuickBASIC 6 programs. The Toolbox contains a wealth of routines that give your programs a more professional appearance as well as increased functionality.

## QB/Pro Series

### QB/Pro Volume 1 — Performance A

Further Quickbasic library routines building upon the routines available in Mach 2 and Toolbox for: Video/Display, Files and Directory, Array Manipulation.

### QB/Pro Volume 2 — Performance B

Further Quickbase library routines building upon the routines available in Mach 2 and Toolbox for: String Manipulation, data Compression, Number conversion, Sequential Files.

## The GreenLeaf C Sampler

Available for Turbo C, Microsoft Quick C/ Microsoft C v.5.0.

### Features Include:-

- Communications AND Windows AND Menus AND General Functions!
- Library files (all models).
- Over 100 functions
- Maximum functionality without duplication of compiler library functions.
- Comprehensive demo and example programs that work, with source.
- Professional 250 page manual.
- Lots of applications and functions selection information.
- Many functions written in assembler for speed, compactness.

# FMS

### Fagan McFarling Systems Pty Ltd.

96 Canterbury Road,  
Middle Park, Vic. 3206  
Ph: (03) 699 9899  
Fax: (03) 699 7501

Prices exclude Sales Tax or delivery charges.  
Most popular credit cards accepted.



**(02) 632 8841**  
OPEN 8 till 8, 7 Days

**(02) 214 7181**  
24 Hrs, 7 Days

# VAPORWARE

A Division of Halldale Technologies Pty Ltd

18 Warnock Street Guildford, NSW 2161 - Fax (02) 632 5298

P.O. Box 286 Guildford, N.S.W. 2161

## What's Your Game ?

### EPYX

|                           |         |
|---------------------------|---------|
| The Games: Summer Edition | \$59.00 |
| The Games: Winter Edition | \$59.00 |
| L.A. Crackdown            | \$59.00 |
| Dive Bomber               | \$59.00 |
| Death Sword               | \$45.00 |

### Broderbund

|                                    |         |
|------------------------------------|---------|
| Where in World is Carmen SanDiego  | \$75.00 |
| Where in Europe is Carmen SanDiego | \$75.00 |
| Ancient Art of War                 | \$75.00 |
| Ancient Art of War at Sea          | \$75.00 |
| Karateka                           | \$52.00 |
| Space Racer                        | \$32.00 |
| Ultima V                           | \$75.00 |

### Mindscape

|                                  |         |
|----------------------------------|---------|
| Balance of Power                 | \$75.00 |
| Deja Vu : A Nightmare Comes True | \$75.00 |
| Gauntlet                         | \$62.00 |
| Harrier Combat Simulator         | \$52.00 |

### Sierra On-Line

|                          |            |
|--------------------------|------------|
| Kings Quest 1, 2, 3 or 4 | ea \$69.00 |
| Police Quest 1           | \$69.00    |
| Police Quest 2           | \$75.00    |
| Space Quest 1            | \$69.00    |
| Space Quest 2            | \$75.00    |
| Leisure Suit Larry 1     | \$59.00    |
| Leisure Suit Larry 2     | \$69.00    |
| Thexder                  | \$54.00    |

### Spectrum Holobyte

|                                   |         |
|-----------------------------------|---------|
| PT109 ( Patrol Boat Simulator )   | \$69.00 |
| Falcon F16 ( Flight Simulator )   | \$69.00 |
| Orbiter (Space Shuttle Simulator) | \$69.00 |
| TETRIS                            | \$66.00 |

### Other

|                                    |         |
|------------------------------------|---------|
| Dark Castle                        | \$49.00 |
| JET (with FREE Scenery Disk)       | \$72.00 |
| Last Ninja                         | \$58.00 |
| Mean 18 Golf                       | \$69.00 |
| Star Trek A- Kobayashi Alternative | \$49.00 |
| Star Trek B- Rebel Universe        | \$49.00 |
| Star Trek C- Promethian Prophecy   | \$49.00 |
| Test Drive                         | \$62.00 |

### DB FAST / Mac

Allows you to port your DBASE programs & Data to the Macintosh. Develop, Compile, Debug & Run your applications

- Interactive Programming Environment
- Tools for creating a Macintosh Interface
- Single step Compile/Link
- No run-time licensing

\$298 inc tax

### OPEN 7 DAYS

### ORDER HOTLINE

Ph (02) 632 8841

Fax (02) 632 5298

### NEW PRODUCTS

### INDIVIDUAL TRAINING™

A collection of unique training software that runs concurrently with popular applications. Select from the following:

- Training for Lotus 1-2-3
- Training for WordPerfect 5.0
- Training for PageMaker (Mac)
- Training for DBASE III+

\$120 each inc tax

### VENTURA PUBLISHER 2.0

New Version of the Premier Desktop Publishing Package with over 70 new Features.

- A new simplified user interface
- 250 HELP Screens covering topics from Getting Started to Kerning.
- Support for more timesteps and more printers.
- Full Colour Support
- Grey Scaling
- Colour Separations
- Much, much more.

\$1450 inc tax

### PC TOOLS DELUXE 5.0

Version 5.0 features a new user interface including pull down windows, mouse support, on-line HELP & several new programs.

- Memory Resident (5K) File and Disk Manager with menu creation system.
- Desktop Manager incl. Outliner, Spell Checker, Calculator, Alarms, Database, Background Comm's.
- Fast Hard Disk Backup with tree display & file compression
- Unfragments Hard Disk
- Compresses & encrypts files
- 500 page manual

\$118 inc tax

## Discount Computer Books

### Programming Languages

|                                    |         |
|------------------------------------|---------|
| C: The Complete Reference          | \$48.50 |
| Using Microsoft Quick C            | \$37.50 |
| Advanced Quick C                   | \$41.50 |
| TURBO C: The Complete Reference    | \$48.50 |
| Using Turbo C                      | \$37.50 |
| Advanced Turbo C                   | \$42.50 |
| Turbo Pascal: The Complete Ref.    | \$49.50 |
| Using Turbo Pascal Version 4       | \$37.50 |
| Advanced Turbo Pascal Version 4    | \$41.50 |
| Turbo Pascal Programmer's Library  | \$41.50 |
| Using Microsoft QuickBASIC         | \$37.50 |
| Using Turbo BASIC                  | \$37.50 |
| Using Turbo Prolog (Covers Ver. 2) | \$37.50 |
| Advanced Turbo Prolog              | \$40.50 |

### Word Processing

|                                              |         |
|----------------------------------------------|---------|
| Displaywrite 4: Made Easy                    | \$37.50 |
| Microsoft Word 4.0: Made Easy                | \$36.50 |
| WordPerfect 5: Made Easy                     | \$36.50 |
| WordPerfect 5: Secrets, Solutions, Shortcuts | \$37.50 |
| WordPerfect 5: The Complete Ref.             | \$48.50 |
| WordStar 2000 Handbook                       | \$41.50 |
| WordStar Professional: Made Easy             | \$35.50 |

### Database

|                                       |         |
|---------------------------------------|---------|
| dBASE III+:The Complete Reference     | \$42.50 |
| dBASE III+:Power Users Guide          | \$42.50 |
| dBASE III: Tips & Traps               | \$35.50 |
| Advanced dBASE III+:Prog & Techniques | \$42.50 |
| Paradox:The Complete Reference        | \$53.50 |
| Paradox: Made Easy                    | \$37.50 |

### Spreadsheets

|                                  |         |
|----------------------------------|---------|
| 1-2-3: The Complete Reference    | \$42.50 |
| 1-2-3: Made Easy                 | \$35.50 |
| Using EXCEL for the PC           | \$41.50 |
| Advanced EXCEL for the PC        | \$41.50 |
| Using QUATTRO: The Prof. S'sheet | \$41.50 |
| QUATTRO: Power User's Guide      | \$42.50 |

### Desktop Publishing

|                            |         |
|----------------------------|---------|
| Using PageMaker for the PC | \$43.50 |
| Mastering VENTURA 1.1      | \$44.50 |

### Other Titles

|                             |         |
|-----------------------------|---------|
| DOS: The Complete Reference | \$49.50 |
| Microsoft Works for the PC  | \$38.50 |
| The ABC's of AUTOCAD        | \$41.50 |

# VAPORWARE

A Division of Halldale Technologies Pty Ltd

18 Warnock Street Guildford, NSW 2161 - Fax (02) 632 5298

P.O. Box 286 Guildford, N.S.W. 2161

(02) 632 8841  
OPEN 8 till 8, 7 Days

(02) 214 7181  
24 Hrs, 7 Days

## CAD PACKAGES

**GENERIC CADD Level 3** **NEW** \$299  
**GENERIC 3-D & Rendering** \$475  
CADD Symbol Libraries available from \$65

## COMMUNICATIONS

**Brooklyn Bridge 2.0 (NEW Version)** \$189  
**Carbon Copy Plus (NEW Version 5)** \$262  
**DeskLink** \$260  
**LapLink Plus (NEW Version 2)** \$210  
**Mirror II (Crosstalk Compatible)** \$ 95  
**PC Anywhere** \$ 199

## DATABASE

**DBASE IV** **NEW** \$CALL  
**DB FAST Compiler** \$250  
**DB XL Ver 1.2** \$269  
**FoxBase Plus or Clipper** \$CALL  
**Q & A Version 3** \$505  
**Quicksilver Compiler Ver 1.2** \$689  
**VP-INFO (Not Copy Protected)** \$175

## DESKTOP PUBLISHING

**VENTURA PUBLISHER 2.0 (NEW)** \$1450  
**NewsMaster II (NEW Version)** \$130  
**PageMaker 3.0 (NEW Version)** \$CALL  
**Pizazz Plus** \$199  
**PFS First Publisher** \$189  
**Publisher's Paintbrush (& FREE Book \*)** \$399

## INTEGRATED PACKAGES

**ABILITY** \$149  
**ABILITY PLUS** \$289  
**Microsoft Works** \$289  
**PFS: First Choice (Version 3)** \$225  
**WordPerfect Executive** \$289

## MICROSOFT SPECIALS

**QuickC or QuickBasic 4.0** ea \$120  
**Microsoft MacroAssembler 5.1** \$215  
**Microsoft C Compiler Ver. 5.1** \$640  
**Microsoft Fortran Compiler V4.1** \$640  
**Microsoft Project** \$598  
**Microsoft Windows 286** \$155  
**Microsoft Windows 386** \$299  
**Microsoft Works** \$289

## NEW PRODUCTS

**3-2-1 BLASTOFF** \$220  
Converts your Lotus formulas into instructions for your math coprocessor chip. Worksheets recalculate 3 to 15 times faster !! Also provides Minimal Recalc.

**ATHENA BIOS** *only* \$95  
Runs CGA programs on Hercules

**THE BALER** \$750  
Compiles Lotus 2.01 Spreadsheets into Microsoft QuickBASIC Programs

**DB FAST** *only* \$250  
dBASE Compiler. Faster than Clipper  
No Run-time licensing fees.

**Disk Technician Advanced** \$280

**Flight Simulator 3.0** \$79

**Microsoft Mouse** \$215

**SOFTSAFE** \$179  
Auto File Encryption, Hard Disk Access Control, Virus Detection, Screen Privacy.

**PROJECT CALC** \$269  
A Project Management add-in for 1-2-3 that uses familiar Lotus menus and produces Gantt & PERT charts. Has full power scheduling, critical path analysis, flexible reports & high quality graphics.

**SIDEKICK PLUS** \$260

**SPRINT (New from Borland)** \$298

**Turbo Assembler/Debugger** \$220

**Turbo Pascal 5.0** \$220

**Turbo C 2.0** \$220

**Turbo Professional** *Pascal 5.0 or C 2.0* \$375

**Turbo Prolog 2.0** \$198

## SPREADSHEET

**LOTUS 1-2-3 (Free Lotus METRO)** \$625  
**PC EXCEL** \$699  
**QUATTRO (FREE Using Quattro Book)** \$310  
**VP-Planner Plus (Lotus 2.01 compatible)** \$260

## SPREADSHEET Add-ons

101 Macros for Excel, 1-2-3, Symphony, SuperCalc, WordPerfect & more ea \$93  
**3-2-1 Blastoff (Lotus Accelerator & Security)** \$220  
**ProjectCalc (Project Manager Lotus Add-in)** \$269  
**SQZ! Plus (NEW Version)** \$139  
**Worksheet Utilities (5 Lotus Add-ins)** \$149

## WORD PROCESSING

**MS WORD 4.0 (FREE Pageview)** \$569  
**WORDPERFECT 5.0** \$594  
**WORDPERFECT Library 2.0** **NEW** \$165  
**SPRINT (from Borland)** \$298  
**Gram•mat•ik III (Style Checker)** \$140  
**Legal or Medical Spell Dictionary** ea \$135

## UTILITIES

**Above Disc** \$150  
**Bookmark** \$179  
**Copy II PC Ver. 5.0 \*\*\* SPECIAL \*\*\*** \$ 59  
**Copy II PC Deluxe Option Board** \$199  
**DESQview 2.01** \$199  
**Disk Technician Plus** \$189  
**D U E T (Print Spooler & sideways printing)** \$130  
**Fastback Plus (NEW Version)** \$242  
**FormTool with Free Greatest Hits** \$197  
**Mace Utilities (Inc. FREE Mace Vaccine)** \$147  
**Memory Mate (Information Manager)** \$120  
**Norton Editor** \$ 109  
**Norton Commander 2.0** \$120  
**Norton Utilities Advanced Ver 4.5** \$193  
**PC Tools Deluxe (NEW Version 5.0)** \$118  
**Print Q** \$179  
**PrintMaster Plus** \$90  
**Q.E.M.M. 386 (Expanded Memory Manager)** \$99  
**QDOS II** \$99  
**SoftSafe (PC Data Security)** **NEW** \$179  
**Take Charge** \$222  
**Tornado (Random Information Processor)** \$159  
**X-Tree** \$ 97  
**X-Tree Professional** \$175

Send orders to:

**VAPORWARE**  
P.O. BOX 286 GUILDFORD, N.S.W. 2161

Please Tick Payment Method:

**MASTERCARD** ☐ **VISA** ☐  
**BANKCARD** ☐ **Cheque** ☐

Please call before  
sending purchase  
orders.

APC 11/88

Signature: \_\_\_\_\_ Expiry Date: \_\_\_\_\_

**NAME** \_\_\_\_\_  
**ADDRESS** \_\_\_\_\_

**P/CODE** \_\_\_\_\_ **STATE** \_\_\_\_\_  
**PHONE ( )** \_\_\_\_\_

Product Name Qty Price Amount

Norton Editor\* ( If order total > \$750 ) FREE

Shipping — \$8.00

All Products are subject to availability.  
All prices include SalesTax and are  
subject to change without notice.

**TOTAL** \_\_\_\_\_

\* While Stocks Last



## MARTOT COMPUTER PRODUCTS

PHONE: (02) 681 1708  
FAX: (02) 682 4521  
P.O. BOX 87, MERRYLANDS,  
2160

## HANDY SCANNER HS-3000

105MM scan width - ideal for logos, letterheads, photographs, all graphics.  
400 dpi (100, 200, 300, 400 dpi selectable) B&W, 32 quarsi-tones  
INCLUDES HALO DPE FREE  
Halo DPE will produce files for Ventura, PageMaker & Windows.  
It will allow scanning, cropping, rotating, combining etc.

### PLUS

### GM-6 Plus Mouse FREE

(Nov/Dec only)

Includes mouse, drivers, menumaker library, Dr. Halo III, pad, pocket.

**\$495 inc. tax**

**O.C.R. software also  
available for HS-3000**

### GM-6 Plus Genius Mouse

**\$109 inc. tax**

### Z-NIX Bus Mouse

Includes: mouse - microsoft compt. drivers, **INTERFACE CARD**, PC Paintbrush III

**\$129 inc. tax**

### PIAZZZ PLUS THE SOPHISTICATED PRINT TOOL

Captures any screen from any application program. Supports mono, CGA, EGA and VGA. Merge screens into VENTURA, MS WORD, PAGEMAKER. Supports POSTSCRIPT in up to 256 grey scales. Supports IMAGE CAPTURE BOARDS

**\$269 inc. tax**

**PIAZZZ  
\$110 inc.  
tax**

**OrgPlus  
\$149 inc.  
tax**

**DEALER ENQUIRIES WELCOME**

## TJ'S WORKSHOP

```

/* numlist.c
   List programs with line numbers. For MSC 4.0/5.0 and TC 1.0
   To compile for MSC: cl numlist.c
   To compile for TC: tcc numlist.c
*/
#include <stdio.h>
#include <string.h>

FILE *infil; /* FILE TO BE CHECKED */
char linebuf[BUFSIZ]; /* LINE BUFFER FOR READING FROM FILE */

main(argc,argv)
char *argv[];
int argc;
{
    int line_cnt;

    /* Check arguments for filename or '?' (help) flag */
    if((argc < 2) || strchr(argv[1], '?'))
    {
        fputs("\007Usage:", stderr);
        fputs(" numlist [d:path\\inputfile\\n", stderr);
        fputs(" or numlist [d:path\\inputfile > [d:path\\outputfile", stderr);
        exit(1);
    }

    if(!(infil = fopen(argv[1], "r"))) /* open input file */
    {
        fprintf(stderr, "\007CAN'T OPEN INPUT FILE: %s", argv[1]);
        exit(1);
    }

    /* get each line and print it preceded by the line number */
    for( line_cnt = 1; fgets(linebuf, BUFSIZ, infil); line_cnt++)
        printf("%3d %s", line_cnt, linebuf);

    fclose(infil); /* open the file */
    exit(0);
}

```

Fig 15 Generate a numbered program listing using this simple C program

a file by overlaying the beginning of the erased file with new data and then deleting it. This is how WIPE.BAT (shown in Fig 11) works. The syntax is

#### WIPE FILENAME

where FILENAME is the filename you want to delete. The WIPE command will delete the original file, then it will copy the WIPE.DAT file (shown in Fig 12) to that filename and delete it once again. Now anyone who attempts to undelete the file will get whatever you entered in WIPE.DAT.

#### M Komarinski

*If you wipe out a large file using this method, a determined person could still reconstruct all but the beginning of the file by hand. Still, foiling all who merely own unerase utilities is a major advantage. Do note that if you pass a filename with wildcards to WIPE.BAT, the line*

**COPY WIPE.DAT %1 > NUL**

*will not overwrite the previously used file names.*

*Fig 13 is a version of WIPE.BAT that accepts wildcards. First, since WIPE.DAT may not be handy on the current drive and directory, it creates its own copy. Then it simply copies WIPE.DAT onto each file in turn, using the FOR command. Only after overwriting all the matching files does WIPE2.BAT delete them — RW.*

### Writing to screen pages other than 0

It is simple to write to a screen page other than 0 using Basic, but in Turbo Pascal 3.0, the Write command always writes to page 0. Fig 14 shows three procedures in Turbo Pascal to manipulate the multiple pages of screens available on the PC (four in 80-column mode and eight in 40-column mode). To convert this figure to work with version 4.0, use the compiler's UPGRADE.EXE with the 13 option.

The SetPage procedure uses BIOS interrupt 10h function 5 to set the current



# XT, AT, 386, COMPUTER PARTS

## COMPUTER MOTHERBOARDS

|             |        |
|-------------|--------|
| XT - 8MHz   | \$145  |
| XT - 10MHz  | \$160  |
| XT - 12MHz  | \$200  |
| XT - A5MHz  | \$250  |
| AT - 10MHz  | \$250  |
| AT - 12MHz  | \$600  |
| AT - 16MHz  | \$850  |
| AT - 20MHz  | \$120  |
| 386 - 16MHz | \$120  |
| 386 - 20MHz | \$2500 |
| 386 - 24MHz | \$3000 |

## VIDEO CARDS

|                |       |
|----------------|-------|
| CGA            | \$90  |
| MGA            | \$120 |
| CGA/MGA MANUAL | \$150 |
| CGA/MGA AUTO   | \$200 |
| EGA 640 X 350  | \$275 |
| EGA 1024 X 480 | \$300 |
| VGA            | \$550 |

## DRIVER CARDS

|                              |       |
|------------------------------|-------|
| 360KB                        | \$45  |
| 1.2MB                        | \$100 |
| 360 720KB 1.2MB 1.44MB       | \$130 |
| XT HARD DISK CONTROLLER FMF  | \$140 |
| XT HARD DISK RLL             | \$200 |
| AT HD FD CONTROLLER FMF      | \$250 |
| AT HARD DISK CONTROLLER ESDI | \$375 |

## MULTI I/O CARDS

|                                 |       |
|---------------------------------|-------|
| I/O WITH 360 DRIVE CONTROLLER   | \$120 |
| 2 SERIAL (1 ON) 1 PARALLEL CARD | \$100 |
| 2 SERIAL (2 ON) 1 PARALLEL CARD | \$130 |
| 4 SERIAL (1 ON)                 | \$80  |
| 4 SERIAL (ALL ON)               | \$250 |
| 2.GAMES PORT CARD               | \$75  |

## POWER SUPPLIES

|      |       |
|------|-------|
| 150W | \$120 |
| 180W | \$180 |
| 200W | \$220 |
| 220W | \$250 |

## DISKETTES

|                   |      |
|-------------------|------|
| 5.25" 360KB X 10  | \$10 |
| 5.25" 1.2MB X 10  | \$40 |
| 3.50" 720KB X 10  | \$35 |
| 3.50" 1.44MB X 10 | \$60 |

## DISKETTE STORAGE BOXES

|                       |      |
|-----------------------|------|
| TO HOLD 100 DISKETTES | \$12 |
|-----------------------|------|

## LOCAL AREA NETWORK

|                               |        |
|-------------------------------|--------|
| ARCNET BOARDS                 | \$300  |
| ETHERNET BOARDS               | \$550  |
| PASSIVE HELP                  | \$50   |
| ACTIVE HELP                   | \$490  |
| CABLE FITTING AND TERMINATORS | CALL   |
| NOVELL ELS NETWORK            | \$1200 |
| OTHER NOVELL NETWORK          | CALL   |

## DISK DRIVES

|                  |        |
|------------------|--------|
| 360KB 5.25       | \$150  |
| 1.2 MB 5.25      | \$200  |
| 720KB 3.50       | \$180  |
| 1.44MB 3.50      | \$200  |
| 21MB HARD DISK   | \$400  |
| 42MB HARD DISK   | \$590  |
| 44MB VOICE CALL  | \$970  |
| 71MB VOICE CALL  | \$1200 |
| 110MB VOICE CALL | \$1500 |

## MONITORS

|                    |       |
|--------------------|-------|
| 12" MONOCHROME     | \$965 |
| 12" DUAL FREQUENCY | \$220 |
| 14" DUAL FREQUENCY | \$250 |
| 14" RGB            | \$580 |
| 14" EGA            | \$850 |
| 14" VGA            | \$975 |

## PRINTERS

|                          |       |
|--------------------------|-------|
| 125 CPS 9 PIN 80 COLUMN  | \$350 |
| 160 CPM 9 PIN 9 COLUMN   | \$450 |
| 160 CPM 9 PIN 136 COLUMN | \$750 |
| 135 CPS 24 PIN 10 INCH   | \$640 |
| 180 CPS 24 PIN 10 INCH   | \$800 |
| 180 CPS 24 PIN 15 INCH   | \$940 |

## INTEGRATED CIRCUITS

|          |       |
|----------|-------|
| 8087     | \$200 |
| 8087-2   | \$310 |
| 8087-1   | \$450 |
| 80287-6  | \$250 |
| 80287-8  | \$550 |
| 80287-10 | \$650 |
| 80387-16 | CALL  |
| 4164     | CALL  |
| 41256-12 | CALL  |
| 41256-10 | CALL  |
| 41256-8  | CALL  |
| 41464    | CALL  |
| 411000   | CALL  |

## MISCELLANEOUS

|                          |       |
|--------------------------|-------|
| PARALLEL CABLE           | \$12  |
| SERIAL CABLE             | \$12  |
| CENTRONICS CABLE         | \$20  |
| RS 232 CABLE             | \$20  |
| 2 WAY PRINT SWITCH CABLE | \$59  |
| 84 KEY KEYBOARD XT/AT    | \$75  |
| 101 KEY KEYBOARD XT/AT   | \$120 |
| XT CASE                  | \$75  |
| AT CASE                  | \$120 |
| MINI CASE                | \$150 |
| POWER CASE               | \$399 |
| SERIAL MOUSE             | \$90  |
| DOS MOUSE                | \$139 |
| JOYSTICK                 | \$35  |
| MODEM - 1200 BPS         | \$290 |
| MODEM - 2400 BPS         | \$450 |
| EPROM PROGRAMMER 1 CHIP  | \$300 |
| EPROM PROGRAMMER 4 CHIP  | \$450 |
| OPTICAL IMAGE SCANNER    | \$445 |

**DISCOUNTS: 5 PIECES - 5%, 10 PIECES - 10%, 20 PIECES - 15%**

For detailed description of all our products, call for our free catalogue or send \$2 postage & handling.

# GCS

**SYDNEY:** 67 Blackshaw Ave., Mortdale 2223. Ph: (02) 570 1215, 570 1225  
**BRISBANE:** 29 Woodstock Road, Toowong 4066. Ph: (07) 371 3133  
**NEWCASTLE:** 653 Hunter Street, Newcastle. Ph: (049) 29 6061

active, or visual, page. The `ClrPage` procedure performs the same function as Turbo Pascal's `ClrScr` function on any page. Pass the procedure the screen you want cleared and the background colour you want it set to. This procedure uses BIOS interrupt 10h function 2 to position the cursor and function 9 to write a character with attribute byte. Procedure `PutPage` will write a character string to any selected page. You must also specify the column and row to print on, and the foreground and background colour. I have included a program to demonstrate the three procedures. The program writes the word 'Data' on rows 1 to 24 on the three nonactive screens. I use white for the foreground colour and set the background colour to the screen number.

## A Bull

*The process of writing to another video page using the BIOS is no faster than writing to the currently active page; however, displaying the prepared pages is almost instantaneous. Note that you could directly address video RAM for the hidden pages without getting any snow — NR.*

## QuickBASIC REDIM benefits

In many instances, using the `REDIM` command instead of `DIM` to create an array makes a lot of sense. When the `REDIM` command is used in a sub-program that is called more than one time, it eliminates the error caused by trying to dimension the same array again. However, there's an even better reason to use the `REDIM` command. `REDIM` forces QuickBASIC to store the array in FAR memory, where it doesn't reduce the available string space.

## Generate numbered C source code listings easily with NUMLIST

All too often my C compiler produces messages like 'Syntax error, Line 17'. It's handy, at times like those, to be able to refer to a source listing with numbered lines. The program `NUMLIST.C`, shown in Fig 15, reads any ASCII file and prints the contents of that file, preceding each line with a number, to standard output (`std-out`).

### R Bernay

*The NUMLIST program is short but just as sweet as they get. After the argument checking and file opening is complete, a simple 'for' loop does the whole job. To ensure that any error messages are visible even if output is redirected,*

```
{SP512,G512,D-,R+}
{ USAGE: e.g., "DIR | SUMDIR" or "DIR *.PAS | SUMDIR" }
PROGRAM SumDir;
VAR
  Line      : STRING[255]; {input line from directory  }
  Code      : Integer;     {error code for VAL procedure }
  FileLenStr : STRING[7];   {file-length part of Line  }
  FileLen    : Integer;     {file length as a number  }
  Sum       : Real;        {total of file lengths      }

BEGIN
  Sum := 0;
  WHILE NOT Eof DO
    BEGIN
      ReadLn(Line); {Read a directory line}
      IF (Line[0] >= #22) AND (Line[1] <> ' ') THEN
        BEGIN
          FileLenStr := Copy(Line, 15, 7); {Extract file length }
          WHILE FileLenStr[1] = ' ' DO {Strip leading blanks }
            Delete(FileLenStr, 1, 1);
          Val(FileLenStr, FileLen, Code); {Make it a number }
          IF Code = 0 THEN
            Sum := Sum+FileLen; {Add it to the sum }
          WriteLn(Line);
        END
      ELSE
        BEGIN
          IF Copy(Line, 11, 7) = 'File(s)' THEN
            {this is the LAST line of the directory -- fix it}
            BEGIN
              WHILE Line[1] = ' ' DO {Strip leading blanks }
                Delete(Line, 1, 1);
              Write(sum:10:0, ' bytes in ');
            END;
          WriteLn(Line);
        END;
      END;
    END;
  END.
```

Fig 16 A filter to add a file-size sum to a directory listing

*they are printed to standard error (stderr), which always goes to the screen. Each line in the source file is read in using the 'fgets' function, and written with a line-number prefix. The listing will be displayed on the screen by default but may be redirected to a disk file with the command*

```
numlist filename.c >
                        filename.lst
```

*To generate a printed copy of the NUMLIST.C program listing, type in the command*

```
numlist filename.c > prn
```

*The BUFSIZ constant, defined in the STDIO.H header file in most C implementations and usually set to 512, is adequate for most jobs of this nature.*

### R Hale Shaw

## Enhancing the DIR command

Sometimes you need to know the space required by all files in a subdirectory, or a subset of those files. Many times I wanted to copy a set of files to a dis-

kette and had to add up the file sizes from the directory to see if they would fit.

To overcome the problem, I wrote a Turbo Pascal filter (Fig 16) that does the job. Invoke it by

```
DIR | SUMDIR
```

or

```
DIR [filespec] | SUMDIR
```

where 'filespec' may contain wildcard characters. For example,

```
DIR *.PAS | SUMDIR
```

would find the sizes of all .PAS files.

### B Bloch

*Now, why couldn't DOS tell us this? It has all the information, after all. But since DOS doesn't, Mr Bloch's filter is a big help. The output of DIR | SUMDIR is just the same as that of DIR, except the final line includes the total size of the files — NR.*

## PageMaker 3.0

The Macintosh Shift key unlocks some

# LOTTOCHECK - a LOTTO Database and Analysis Program.

*No man-made machine is a perfect random number generator. The one used to draw winning lotto numbers is no exception. Lottocheck is a program designed to find the biases. We make no outrageous claims for it. Our estimation is that it can be used to find numbers that have won 5 to 10 times more prizes than the statistical average. If you play LOTTO, you should wisely choose your numbers using Lottocheck. A brief overview follows:*

**FIGURE 1** is a screen snapshot of the *Prizes* option in progress. The user has chosen to test a System 10 over the history of draws stored in the database. (Lottocheck comes with an up-to-date database of all past draws). These chosen numbers are 3, 5, 8, 10, 15, 16, 23, 25, 35, 41 which have a square around them on the screen-coupon. Progress has been halted at draw 569 due to some prizes been won. The numbers with white backgrounds are the 6 winning nos. for draw 569. The 2 numbers with slightly darker backgrounds, are the 2 supplementary numbers. The tables to the left indicate prizes won. This System 10 has won a 1<sup>st</sup> division, six 2<sup>nd</sup> divisions, etc. for draw 569. The 2<sup>nd</sup> table is a running total of prizes won up to that date. This System has done the improbable of having won **two 1<sup>st</sup> divisions** so far. Eleven draws had previously passed since the last prize. The worst such prize drought was for 46 draws. The analysis will continue when the user presses any key.

**FIGURE 2** is the screen-form via which the user ADDs new data. Like all input-screens used in Lottocheck, the entry is made as easy as possible. When you move the cursor from one box to another, the prompt message at the bottom of the screen, changes to tell you what is required. If you are still unsure, pressing the F1 key summons a pop-up HELP message. If you are still uncertain, the **26 page Manual** is very clear and helpful. When you enter numbers, the program will not let you enter a number greater than 45 (or 40 for NSW). Nor can you accidentally enter the same number twice. Other database functions not shown here are MODIFY, DELETE, LOOK, BROWSE, data EXPORT.

**FIGURE 3** is a resultant histogram using the *Graph* option. In this instance the user has chosen sub-options to look at just the 2<sup>nd</sup> ball out of the barrel. And just Saturday draws using the **DAY** restriction. You can choose such a graph on any drawn position, or effectively ask it to: 'count it if it was any winning ball - I am not interested in the order it was drawn'. As well as being able to place DAY restrictions, you can have any of the Lottocheck analysis options start from any draw in the database, rather than the beginning.

Other features not shown here include a **QUICK PICK** option and a sophisticated **EVALUATE** option that uses rankings to test theories.

When we designed Lottocheck, not only did we set out to provide a sophisticated data recording and analysis system for lotto numbers, we wanted it to be a show piece in user-friendliness. We feel our aims were well met. **Here are just a few user comments:**

*'I bought Lottocheck (NSW 6-40) from you last Feb. and have been very impressed ever since...I would like to now buy the 6-45 version...I must congratulate you on your excellent programming, presentation and user-friendliness!'*

A. Garrisson, Kingston, ACT.

*'Congratulations on a fine, straight-forward program.'*

D. Rivett, Mt. Waverley, VIC.

*'Congratulations on your program. Lottocheck has enabled me to cross-reference my theories and has proven to be a valuable asset.'*

K. Richards, Morphett Vale, SA.

A number of people have bought further copies as gifts to friends.

(Note: LOTTOCHECK is for IBM PC XT, AT and compatibles.)

LOTTOCHECK MAIN MENU  
EVALUATE NUMBERS CHOSEN

DRAW NO: 569  
DATE: 03/01/87  
DIV. PRIZES TOTAL

|   |    |     |    |    |    |    |    |    |    |    |    |
|---|----|-----|----|----|----|----|----|----|----|----|----|
| 1 | 2  | 11  | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 2 | 8  | 12  | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 3 | 18 | 35  | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 4 | 90 | 255 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 5 | 50 | 280 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |

SELECTION CRITERIA 31 32 33 34 35 36 37 38 39 40  
WEEKDAY: SAT  
TYPE: 41 42 43 44 45  
SYSTEM 10 NO'S: 3 5 8 10 15 16 23 25 35 41

Encountered prize > or = selection criteria, any key to continue.

Fig. 1 - Screen snapshot of the PRIZES option in progress.

LOTTOCHECK MAIN MENU  
SCREEN-BASED RECORD

DRAW NO:  DRAW DATE:  DRAW DAY:   
DRAW TYPE:   
NUMBERS:            
SUPPS:

ADD: The DRAW NO may be 1 to 4 digits long, (1-9999).

Fig. 2 - An input screen-form, used to update the database.

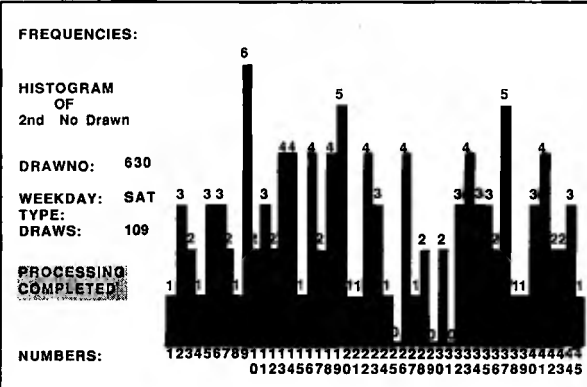


Fig. 3 - A Resultant histogram from the GRAPH option.

The \$15's paid for a demo disk is refundable against a full purchase. All prices below are the FULL prices (ie. inc. s.tax, postage, etc.).  
Lottocheck 6-45 (Aust-wide) \$69..... ☐ Demo 6-45 \$15...  
Lottocheck 6-40 (NSW Golotto) \$69... ☐ Demo 6-40 \$15...  
I want to pay by \_\_\_\_\_ (Mastercard, Visa, Bankcard).  
Cheques, Money Orders, and **phone orders** are also welcomed.  
Card no: \_\_\_\_\_ Expiry date: \_\_\_\_\_  
Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_



Send to:

Solid Software,  
P.O. Box 218,  
Belgrave, Vic. 3160.  
(03) 7544377.



hidden features that Aldus forgot to put in its documentation for PageMaker.

Shift-click on a page number icon and you will force a fit to window view when the page turns, no matter what the previous view had been. Holding down Shift while selecting 'Go to page' from the Page menu will make the pages turn automatically starting from what page you are on and stopping when you click anywhere in the window. If you have a multi-page document, it will cycle through the document and start again at page one, bypassing the master page(s). The views will be as you had last left them for each page.

Aldus does let you in on a couple of things, though. For instance, holding down Shift while selecting 200 per cent view will yield a 400 per cent view. This little gem can be found in the online PageMaker Help file. You can also hold down the Shift key and choose Revert in the Edit menu. This will revert to the last mini-save, instead of to the last Save.

While in the Define colours dialogue box (assuming you have a colour monitor), hold down the Shift key while selecting Edit and you will get the Apple colour wheel instead of the normal editing menu. This has been documented,

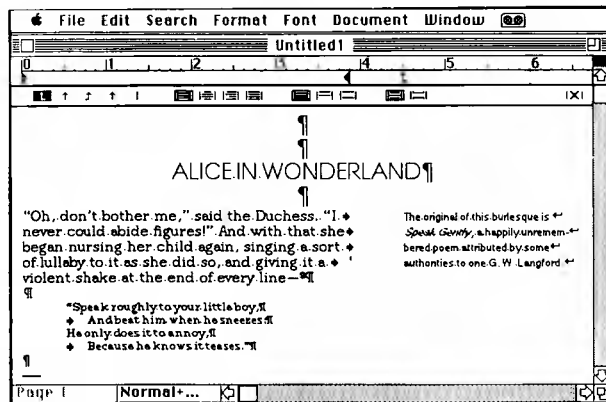


Fig 17 You can include 'marginalia' in a Word document by setting a tab stop to the right of the right margin — nice if you don't want to fiddle with the side-by-side paragraph feature. This has the added benefit of allowing you more of a WYSIWYG look on the screen

but PageMaker Help incorrectly states that you should use the Option key.

**M Safir**

## Unequal width columns on Mac Word 3.0x

Here's how you can produce columns in Word of unequal width for use in presentation notes. This is useful if you don't have access to a page-layout program and don't want to resort to the side-by-side paragraph feature.

By moving the right margin in and creating a tab stop beyond the margin, you can set up the appearance of a

separate column for notes or 'marginalia'. For the line ends of the marginalia you'll have to use Shift-Return instead of a simple Return. (See Fig 17 for an example.) It's not necessarily the most sophisticated way of accomplishing this effect, but it is quick and easy.

**J Voorhies**

## Sorting with Word

Here's a useful Mac Word technique that is especially helpful in business correspondence such as letters and memos. When you send out a memo or

# Friendly Display

*Reason why our monitor with higher resolution, more color, compact sharp --- You'll prefer to work with your PC more closely*

**TRI ROYAL**  
INFORMATION ELECTRONICS CO. LTD

7FL-1, NO. 63, CHANG AN E. RD., SEC. 2, TAIPEI, TAIWAN, R.O.C.  
TEL: (02) 5060396, 5060429, 5065646  
FAX: (02) 5065626  
TELEX: 27974 ROYALL

### Economic 720 x 350 screen high resolution monochrome monitor series

- T-1218: 12" monochrome, Single freq. - 18.432 KHz.
- T-1228: 12" monochrome, Dual frequency - 18.432/15.75 KHz.
- T-1418: 14" monochrome, Single freq. - 18.432 KHz.
- T-1428: 14" monochrome monitor with dual frequency.

### Enhanced monitor series

- CT-1458 enhanced Multisync color monitor:
- \* 14" color.
- \* Horizontal frequency: 15 - 45 KHz.
- \* TTL / Analog
- \* Resolution - 800 x 600

- CT-1456 EGA monitor:
- \* 14" color.
- \* Horizontal frequency: 21.8 & 15.75 KHz.
- \* Resolution - 720 x 350

- T-1429 high resolution flat screen monitor:
- \* 14" monochrome.
- \* Horizontal frequency: 29 KHz.
- \* Resolution - 1,024 x 768

- T-1438 high resolution flat screen monitor:
- \* 14" monochrome.
- \* Multisync.
- \* Horizontal frequency: 15 - 39 KHz.
- \* Resolution - 1,024 x 768

- 14" VGA series:
- \* Resolution: 720 x 480
- \* Model T-1448: 14" monochrome
- Model CT-1468: 14" color.

### Professional 19" super high resolution Multisync monitor

- T-1918 / CT-1958 Multisync series:
- \* Horizontal frequency: 15 - 51 KHz.
- \* TTL / Analog.
- \* Model T-1918 resolution - 1,024 x 768
- Model CT-1958 resolution - 1,024 x 768

- T-1928 / CT-1968 Multisync series:
- \* Horizontal frequency: 51 - 85 KHz.
- \* TTL / Analog.
- \* Model T-1928 resolution - 1,280 x 1,024
- Model CT-1968 resolution - 1,280 x 1,024.



# KNOX DISTRICT CENTRE 1ST BIRTHDAY SALE

**GREAT SAVINGS AND SPECIALS ON ALL • COMPUTERS  
• MONITORS • PRINTERS • SOFTWARE • PLUS MORE!**

**10-50% OFF Top Brands**

• IBM • AMIGA  
• COMMODORE 64

**commodore BM13**  
• Green Screen • H. Resolution  
• Professional TTL Monitor

**SUPER SPECIAL**  
RRP \$360 **\$149 SAVE \$211**

*While stocks last — be quick!*  
**Color Monitors from \$499**

**SOFTWARE**

**commodore AMIGA 500**

**\$200 FREE SOFTWARE OFFER**  
Call or visit our stores for more details

**AMIGA 2000**  
**SAVE \$300**

**AMIGA 1010 DRIVES**  
RRP \$499  
**\$349**

**SAVE \$150**

Buy an Amiga 2000 during our Birthday Sale and receive an extra Floppy Disk Drive valued at \$300. While offering the latest in technology, the Amiga 2000 still allows you access to thousands of existing programs, at a price you can afford.

**PRINTERS**

**commodore 6400**

The Commodore 6400 Printer, a top Quality Daisy Wheel Printer with superb letter quality, 40 cps and centronics interface, suits most PC's incl. IBM & AMIGA

**\$599** RRP \$995  
**SUPER SPECIAL** **SAVE \$396**

**Commodore MPS 1280**  
15" wide carriage, 120 cps, suits AMIGA, IBM/PC. **\$699**

**EPSON**

EPSON LX-800 \$ Call  
EPSON LQ-500 \$ Call  
EPSON LQ-850 \$ Call  
EPSON EX, FX - \$ Call

**PC COLT**

The PC COLT is the latest high performance PC XT from Commodore. Designed specifically for use in both the office and the home. Commodore's philosophy has always been to provide "high-tech at low cost", thus the PC COLT continues to be the best value entry level PC on the market.

**\$1295**

Before you buy a computer come in and see the latest in U.S. Technology... The ALR DART 286 and The ALR 386 from Advanced Logic Research Inc.

With quality you can see, these computers have been meticulously built and are ideal stand alone or network controllers.

2MB on board capacity facilitates the latest operating system - MS OS/2 without any costly add-on memory boards.

Ultra Phase providing the best value-for-money in computers.

**Performance Power .... Price**

**ALR**

**MODELS FROM \$2995**

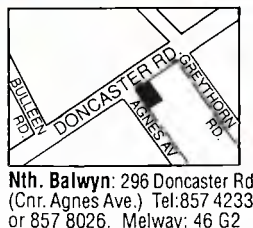
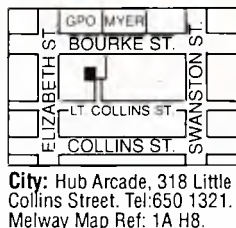
**Great Savings on all Computer Systems, incl. our Range of**

**AMIGA EPSON commodore SHARP**

**ULTRA PHASE**

**• C • O • M • P • U • T • E • R • S •**

All Specials  
Available  
at our  
3 STORES



**FOR ALL BUSINESS SYSTEMS ENQUIRIES FAX 857 4466**

**TRADING HOURS**  
ALL STORES: Mon - Wed 9am - 5.30pm Thurs 9am - 7.30pm Fri 9am - 9pm  
OPEN ALL DAY SATURDAY 9am - 5pm (EXCEPT CITY STORE 9am - 3pm)



## BARCODE SOFTWARE



**EZBARCODE I:** Easy to use utility program to enable you to print barcodes on most dot matrix printers and HP compatible laser printers. You can enter barcodes direct from your keyboard and print them by simply pressing a button. Allows you to easily adjust barcode height, vertical spacing, left margin and more. Even allows you to print extra dark to adjust for a weak ribbon. Requires 256K RAM.....\$99

**EZBARCODE II:** In addition to the features of EZBARCODE I, program offers a number of advanced features. Prints Code 39, UPC-A, and Interleaved 2 of 5 barcodes as well as normal text. Automatic incrementing allows unattended printing of barcodes, and barcodes can be entered direct from keyboard or from a text file. Can import data from Lotus and dBase, and context sensitive help available at all times. Requires 384K RAM.....\$199

**dBARCODE:** Fast assembly language subroutine for use with dBase III+. Allows you to print barcodes direct from your dBase application. Supports dot matrix and HP compatible laser printers. Menu driven allows for easy choice of bar code type, size, vertical spacing, left margin, and text. ....\$199

We also carry a range of barcode reading equipment and a range of other software. If you require further information please contact us.

To order send cheque, money order, or credit card details to

**Budgetware**  
P.O. Box 464  
Newtown NSW 2042  
or call (02) 519-4233

Fax (02) 516-4236

**Free Delivery**

**Dealer Enquiries Welcome**

letter to a relatively large distribution list, you generally need to alphabetise this list. This is a fairly standard practice that ensures nobody thinks he is being slighted by being on the bottom of the list.

You can alphabetise the list on-screen with Cut and Paste, but you can also do it with the Sort command in the Document menu. First separate the 'cc:' comment from the first initial with a decimal tab.

Set the same tab for each succeeding name. Since it's a decimal tab, the initial letters will all be flush with each other. Then use the Option-Select feature to select the last names only as a column. Choose the Sort command. Your list is now sorted alphabetically by last names. Without the Option-Select feature, the list would be sorted by first initials. The only cleanup after the sort is to move the 'cc:' comment to the top again with a Cut and Paste. (See Fig 18 for a step-by-step tour of this technique.)  
**L McCarthy**

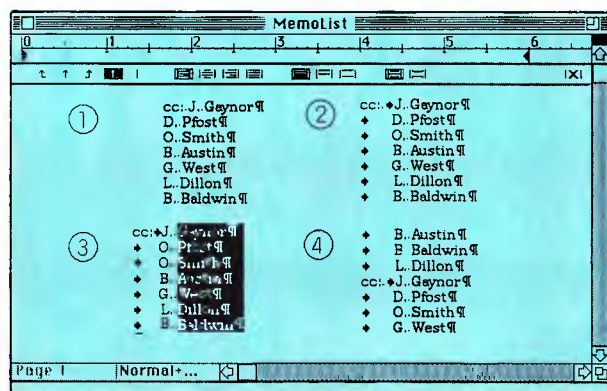
## Equation skeletons on a Mac

Using formulae (math typesetting) in Word on a Macintosh is a powerful way to write equations and create other special effects.

The implementation is, however, very 'un-Mac-like' compared with desk accessory equation processors (for example, Expressionist). Here's a simple example that shows how to make this feature work for you instead of against you by creating 'equation skeletons' defined as Glossary items.

First turn Show ¶ on (Command-Y toggles it on and off). Type Command-Option-backslash-F(*n*,*d*) as the code for fractions. Format the *n* (numerator) and the *d* (denominator) in italics. Select this code, choose Glossary from the Edit menu, type 'fraction', and click define.

Then, to add it to the Work menu, type Command-Option and click the word 'fraction' on the Glossary entry window with the cursor (which is now shaped like a bold + sign). Now when you need to type a fraction simply pull



*Fig 18 Alphabetising memo distribution lists is a snap with Word's column select feature (Option-drag select). 1) Shows the text as typed in. 2) Adds decimal tabs to separate the names into a 'seizable' column. 3) Demonstrates the use of Word's Option drag select feature to separate the last names for consideration by the Sort command. 4) Shows the list after Sort. All you need to do now is Cut and Paste the 'cc:' comment back up to the top of the list*

down the Work menu and select 'fraction'. The formula will appear on-screen. Drag over the arguments *n*,*d* and replace them with your desired numerator and denominator (separate them with a comma). The result will be correctly formatted in italics.

**C Taylor**

## Saving System file space

For those who have received the desk accessory Word Finder from Microsoft (this is to be included as a standard feature in version 4.0), here's how you can save space in your System file by loading it directly into the application.

Simply double-click on the DA icon. When Font/DA Mover comes up, click on the Open button while holding the Option key down. Then all files and applications may be accessed.

Select the Word application and install the DA into it. Now Word Finder will appear under the Apple menu only when you load Microsoft Word.

**C Plummer**

## Centring text in FreeHand

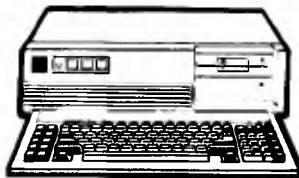
FreeHand offers text on a curved path, but accurately placing text around the outside of a circle can be a challenge. The text normally starts to wrap clockwise around the outside of the circle beginning from the nine o'clock position. But to centre a word or phrase at the top of the circle, first draw your circle. Then select the Text tool and



# MACANZA GIVES YOU VALUE! VALUE!

## \* 20 MEG 286 IBM® AT Compatible Computer

OS/2  
Compatible



101  
Keys

- 80286 16 Bit Microprocessor
- 1.2 MEG Floppy Disk Drive
- Parallel & Serial Printer Ports
- \*13MHz (Landmark CPU Rating)
- 101 Key "AT Style" Keyboard • 0 Wait State
- BIOS W/Built-In Support for 31/2" Drives
- Clock/Calendar & Security Keylock
- Dual Mode Hercules/CGA Adaptor
- 200 Watts Power Supply
- State-Of-The-Art Small Footprint Case Design
- 640KB RAM, Expandable to 1Mb on Board
- 20Mb Hard Disk with HD/FDD Controller

**Our Low Sale Price**

# \$1999

RRP \$2795

## \* 10 MHz IBM® Turbo XT Compatible System



Dual  
Colour/Mono  
Adaptor

V20  
CPU

DOS 3.3A  
GW Basic

101  
Keyboard

- Latest SMALL FOOTPRINT design
- 3 speed 4/8/10 MHz Sony V20 CPU
- 360KB Floppy Disk
- Sculptured 101 Keyboard with Dust cover
- 512KB RAM, Professional Turbo XT System
- Serial/Parallel/Clock/Game
- Dual Mode Hercules/CGA Adaptor
- Licd. MS-DOS 3.30A, GW Basic, Manuals

**UNBELIEVABLE VALUE!!!**

**Our Low Sale Price**

# \$999

RRP \$1495

- |                                |             |
|--------------------------------|-------------|
| • Panasonic 9 Pin Printer      | \$369       |
| • 1.44MB 3.5 inch Floppy Drive | \$229       |
| • 720 KB 3.5 inch Floppy Drive | \$189       |
| • Brand name dual scan monitor | \$189       |
| • EGA Monitor                  | \$689       |
| • EGA Card                     | \$199 extra |
| • 40MB Hard Drive              | \$249 extra |
| • Brand Name multisync monitor | \$909       |
| • Logitech Mouse               | \$159       |
| • Other Peripherals            | Call        |

## DEALER ENQUIRIES WELCOME! MAIL ORDER WELCOME

- All products supported by full warranty
- All prices include sales tax
- Products sourced from official Australian Distributors

Prices correct at time of printing, subject to stock availability

# MACANZA

PTY LTD

# COMPUTERS

Suite 5, 22-36 Mountain St,  
ULTIMO, NSW 2007

Tel: (02) 281 3088  
Fax: (02) 281 5787

# We are founded on R & D and manufacturing: So you can have satisfied customers and strong sales.

**NEW TECH INTERNATIONAL CO., LTD. IS A PROFESSIONAL DESIGNER MAKER OF 286/386  
MAIN BOARDS AND SYSTEMS. ALL OUR PRODUCTS INCLUDE THE LEGAL BIOS.**

## CONTACT US FOR MORE DETAILS.

### NTB-1020 NEAT 286 MAIN BOARD:

- 80286-16 CPU
- 10/12/16/20MHz. SOFTWARE/HARDWARE SELECTABLE
- PAGE INTERLEAVE MEMORY CONTROLLER
- SUPPORTS 20MHz 0 WAIT STATE WITH 100NS DRAM
- SUPPORTS LIM EMS MEMORY CONTROLLER

### —2MB/8MB MEMORY ON BOARD

### ALSO AVAILABLE:

NTB-8120 8/10/12MHz 0/1 WAIT STATE. BABY 286 MAIN BOARD.

— 1 SERIAL AND 1 PARALLEL ON BOARD

NTB-1620. 1624 32BIT 80386 CPU WITH 80387 AND

80287 SOCKETS ON BOARD

**NEAT 286 26.7MHz  
386 34 MHz**



**RUN ALL 8088/86, 80286 & 80386 PROGRAMS AND OPERATING SYSTEMS.  
INCLUDING MS-DOS. OS/2. WINDOW/386. UNIX. XENIX. LOTUS-123. AUTO CAD NOVELL. ETC.**

**\*ALL SYSTEMS WERE 36 HOURS BURN-IN TEST ONE YEAR WARRANTY.**



## NEW TECH INTERNATIONAL CO., LTD.

11FL. NO.200, HOPING E. RD., SEC.1, TAIPEI, TAIWAN, R.O.C.

P.O.BOX: 7-846 TAIPEI

TELEX: 29001 NTK TPE

TEL: (02)392-9446, 392-9493

FAX: 886-2-3965764

EMS (Expanded Memory System) is a trademark of Lotus Development Corp.  
IBM and IBM PC/AT are trademarks of International Business Machines Corp.  
Microsoft, OS/2 are trademarks of Microsoft Corp.



SMS-PC-8112B system  
80286-10CPU (8/12 MHz)



## Sun Moon Star

Sun Moon Star began as a trading company in 1945. In the forty years since, SUN MOON STAR has developed into an international and multidimensional enterprise with over thirty subsidiaries. SUN MOON STAR is now expanding in five major areas of business and has branch offices and representatives worldwide.

Count on Sun Moon Star in:

- \* Computer
- \* Telecommunication
- \* Trading
- \* Financial services
- \* Real estate

**We not only manufacture PC's, mainboards,  
addon cards, switch power supplies and  
UPS, but we export and service our  
equipment as well.**

**OEMS & OVERSEAS DISTRIBUTORS WELCOME**



SMS-PC-1116N MAIN BOARD  
80286-16CPU (8/16 MHz)

## SUN MOON STAR CO., LTD

164 MIN SHEN E. ROAD, TAIPEI, TAIWAN, R.O.C.

TEL: 886-2-5818521, 886-2-5976584

FAX: 886-2-5976583, 886-2-5417274

TELEX: 22199 SMSCO



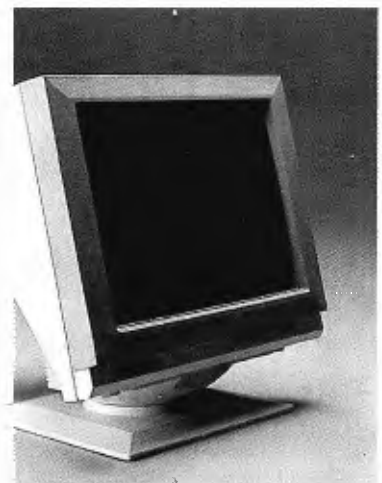
### **MEG-286 M**

- \* 8/12MHz Motherboard, Expandable to 4MB
- \* Two 5.25" or 3.5" Disk Drives and One 5.25"
- \* CGA, MGA, EGA, Super EGA, VGA Optional
- \* Legal AMI Bios



### **MEGADATA - Laptop**

- \* 80286, 6/12MHz At 0 Wait-State
- \* 640 x 400 Bit-Mapped Gas Plasma, 2 Gray
- \* 20 MB 3.5" Hard Disk
- \* 1.44 MB 3.5" Floppy Disk
- \* Serial Port\* 2
- \* One Expansion Slot For Half-Size Interface Card
- \* 12.2"(W) x 14.2"(D) x 3.5"(H)
- \* Weight 15.4 LB (7Kg)



### **MD-1421**

**Flat Screen  
Monochrome Monitor**

#### **Resolution**

- \* 100 lines at Center
- 720 dots x 350 lines

#### **Display Colors**

- \* Monochrome (Green/Amber/White/ Golden—Yellow)

#### **Power Source**

- \* 110/220 VAC, 60/50 Hz HZ

#### **Dimensions**

- \* 325(W) x 315(H) x 327(D) mm

# WHY IS MEG YOUR BEST CHOICE? EVER FOR EXCELLENCE

ADD: 12F, No 591 Tun Hua South Road,  
Taipei Taiwan R.O.C.

**MEGADATA**  
MEGADATA SYSTEMS CO., LTD.

TEL: (02) 705-2121 FAX: (02) 708-9936  
TLX: 15027 MEGADATA



# THERE IS SOMEONE OUT THERE WHO DOESN'T LIKE US ...OUR COMPETITION!

*WE ALSO MANUFACTURE A WIDE SELECTION  
OF CONTROL CARDS AS WELL AS 16 BIT  
PERSONAL COMPUTERS*

## THREE REASONS WHY :

- WE CAN USE SOFTWARE TO RUN EMS.
- 8 KINDS MODE OF MEMORY ALLOCATION, 3 KINDS MODE OF EMS V4.0.
- LOWER MAINTENANCE
- SEPERATED CPU AND AT BUS CLOCK (WITH CHANGEABLE SPEEDS)
- DECREASED ERROR
- SMT MOUNTING FOR IMPROVED RELIABILITY.

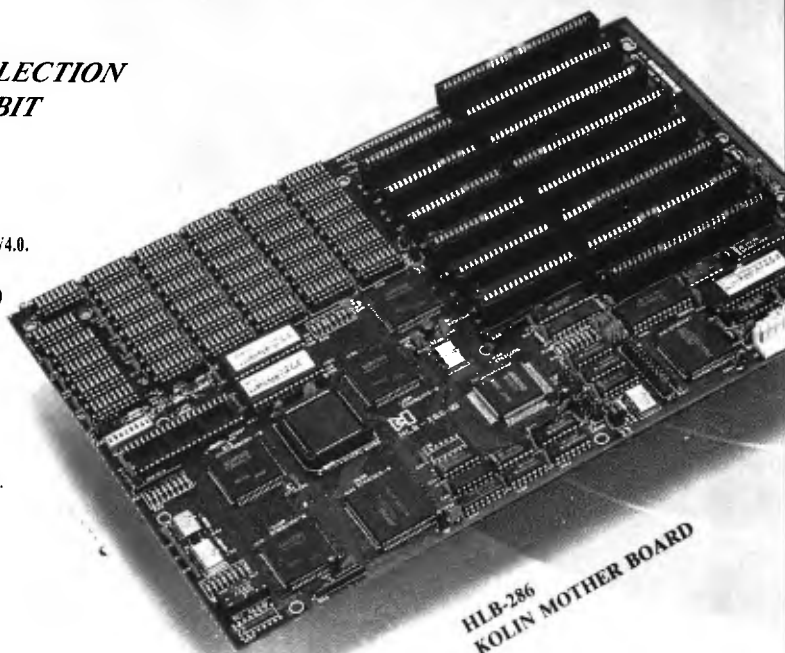
## ADDITIONALLY: IBM PC/AT COMPATIBLE

- HLB-286A-6/10 MHZ WITH 80286-10 CPU.
- HLB-286B-8/12 MHZ WITH 80286-12 CPU.
- 8 SLOTS, TWO 8 BIT SLOTS AND SIX 16 BIT SLOTS.
- TWO RS-232 PORTS AND ONE PARALLEL PORT BUILT-IN ON BOARD.
- ZERO WAIT STATE OR ONE WAIT STATE SELECTABLE.



## HSIN-LIN COMPUTER CO., LTD.

3F, NO. 86, SEC. 1 CHUNG CHING S. ROAD  
TAIPEI, TAIWAN, R. O. C. TELEX: 22839 HSINLN  
FAX: 886-2-3149989 TEL: 886-2-3149974



IBM, PC, XT, AT are registered trademarks of International Business Machines Corp

## AT/PC 12MHz

- 640K RAM Expandable to 4Mb
- 6/12MHz Zero/One Wait State
- 1.2Mb Floppy Drive
- 20Mb Hard Disk
- DTC HDD/FDD Controller
- AT I/O Card W/P.S,G Ports
- Dual Card W/Auto Switching
- 101Key Tactile Keyboard
- Norton SI:15.3 Landmark: 16Mz
- ONLY **\$2250**

## MONITORS

|                          |        |
|--------------------------|--------|
| Thomson 4460 EGA Monitor | \$582  |
| 4460 W/Card & Mouse      | \$792  |
| Thomson 4570 P-Scan      | \$840  |
| Thomson 4375 U-Scan      | \$888  |
| Thomson 4165 .38 CGA     | \$520  |
| Thomson 4121 PAL CGA     | \$480  |
| Taxan Super Vision 625   | \$650  |
| ECM 5400 .31 EGA         | \$660  |
| NEC Multisync II         | \$1050 |
| NEC Multisync Plus       | \$1560 |
| NEC Multisync XL         | \$4560 |
| Mono Dual Mode           | \$200  |
| Mono Composite Green     | \$120  |

## XT/PC 10MHz

- 640K RAM W/360K FDD x 1
- 20Mb Hard Disk Drive x 1
- Multi I/O Card W/Clock
- Par/Ser/Game Ports
- 180W Power Supply
- AT Case W/K-B Lock
- Dual Card Output
- 101-K Tactile Keyboard
- Norton SI:4
- ONLY **\$1550**

## PRINTERS

|                       |          |
|-----------------------|----------|
| Star NX-1000          | \$430    |
| Star NX-1000CL Colour | \$550    |
| Star NX-15 15in       | \$650    |
| Star NX-2410 24 Pin   | \$680    |
| Star NB24-15 24 Pin   | \$1296   |
| Star NL-10            | \$430    |
| Epson LX-800          | \$450    |
| Epson LQ-500          | \$720    |
| Brother 1109          | \$300    |
| Olympia N-30          | \$450    |
| Printer Stand         | \$28     |
| Printer Ribbons       | From \$8 |
| Printer Cable         | \$15     |

## PERIPHERALS

|                           |       |
|---------------------------|-------|
| Diskettes 5" 10 Pack      | \$10  |
| Diskettes 3.5" 10 Pack    | \$30  |
| National 360K FDD         | \$160 |
| Toshiba 1.2M FDD          | \$180 |
| Sony 3.5" 720K FDD        | \$220 |
| Sony 3.5: 1.4M FDD        | \$250 |
| 8088 CPU Main Board       | \$180 |
| 80286 CPU Main Board      | \$540 |
| Thomson 480 EGA Card      | \$280 |
| Thomson EGA Card W/Mouse  | \$320 |
| 20Mb HDD W/Controller     | \$450 |
| 30Mb HDD W/Controller     | \$492 |
| 40Mb HDD W/Controller     | \$588 |
| 150W Power Supply         | \$150 |
| 200W Power Supply         | \$220 |
| 84 Key Keyboard           | \$100 |
| 101 Key Keyboard          | \$130 |
| Colour Graphic Card       | \$90  |
| Mono Hercules Card        | \$120 |
| Dual Autoswitching Card   | \$150 |
| Witty Mouse               | \$80  |
| Joystick Quickshot        | \$28  |
| Computer AT Style Case    | \$130 |
| Tower Case W/Power Supply | \$580 |

**MORE MORE MORE  
DETAILS PLEASE CALL  
DEALER ENQUIRY WELCOME**

## SIMON & MAY T/A CLURARM PTY LTD

SUITE 3A/10 POPE ST (P.O. BOX 218) RYDE, NSW 2112  
PH: (02) 809 6941 FAX: (02) 809 7216

## TJ'S WORKSHOP

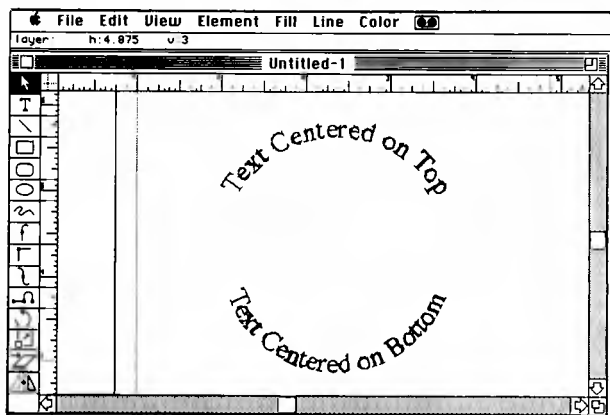


Fig 19 FreeHand allows you to join text to a curved path, but getting it to centre just the way you want it can be a pain. Here, text is centred at 12 o'clock high and 6 o'clock low — the circle is, indeed, unbroken

click your insertion point above the circle.

In the Text dialogue box that pops up, choose the typeface, point size, etc, and type in your text. OK your selections. Select the text block and the circle, and then hit Command-J to join your text to the circle. You will notice that your text moved to the centre of the curve path at the three o'clock position. To move it to the 12 o'clock position, use the Rotate tool and rotate the joined circle and text 90-degrees counter-clockwise by dragging the bottom-right size box to the position of the top-right size box.

Getting the text to wrap counter-clockwise along the inside of the circle, centring at the six o'clock position requires a technique that is similar to the previous procedure, but with a slight twist. Follow all the previous steps, hit Command-J to join text and circle, then use the Mirror Reflection tool to flip the circle vertically. Now the text is wrapped along the inside of the circle at the bottom.

To combine the two circle texts as in Fig 19, select them, choose Align elements (from the Element menu), and hit the radio button Centre for both Horizontal and Vertical alignment — the circle is now unbroken!

C Keegan

### Using HyperCard without closing desk accessories

A common complaint about HyperCard and desk accessories is the need to close a desk accessory before using HyperCard again. There is a way around this.

Make sure that the Tools 'windoid' is open in the stack. Move the desk accessory window (here the Scrapbook) to the bottom of the screen (so it is out of the way). Now click on the Tools 'windoid'. You will notice that the title bar

of the desk accessory window is now white, indicating that it is inactive. You can now use HyperCard normally while the desk accessory waits for a click in the title bar to reactivate it. In the case of the Scrapbook, this is handy for copying clip art from the stack into the DA.

D Loverink

### Handling SuperPaint with graphics

If you find yourself constantly cleaning noseprints off your screen from trying to move tiny objects around in SuperPaint, try drawing a line near the object to be moved, then group the two objects, and use the line as a handle to move the miniscule item to its new destination.

In addition, this also keeps the pointer tool from blocking your view. Or you could just tie a handkerchief over your face! (This technique works in a number of graphics programs that allow grouping — try it out — Ed.)

G Spivey

END

### Note to readers

APC is looking for a number of people experienced in the use of one or more microcomputers to assist assessing the huge number of submissions this column generates each month. A firm grasp of English grammar is also essential.

An estimated twelve to twenty hours per month will need to be devoted to the task and remuneration will be commensurate with workload.

Sound interesting? Contact Cathie Kennedy on (03) 531 8411 during business hours to learn more.

## BLITZER 1234E MODEM

OUR LONG AWAITED  
MODEL BBM-1234E  
IS AT LAST HERE!



With these features:

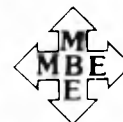
SYNCHRONOUS AND ASYNCHRONOUS COMMUNICATIONS MODES  
CCITT V22bis (2400 BPS), V22 (1200 BPS), V21 (300 BPS) and V23 (1200/75 BPS)  
BELL 212A (1200 BPS) & 103 (300 BPS)  
Auto dial  
Tone or pulse dialing  
Auto answer  
Auto redial  
Full Hayes AT command set including all 19 S registers  
Call progress monitoring  
Loop back for remote diagnostic  
Carrier detect disconnect time adjustable  
Internal speaker with volume manually and software controllable  
12 LEDs (LIGHTS) indicate status and activity  
Low power consumption 1.5 watts

Housed in an attractive low profile black anodised aluminium case, the Blitzer is professionally packaged and is available for just \$549 incl. tax

Please note that unlike some cheaper modems, the Blitzer DOES NOT suffer from pattern sensitivity when handling 8 bit words.

Please call us or contact your dealer for more information about the five Blitzer models now available.

Distributed by:



MIKE BOORNE  
ELECTRONICS  
PTY. LTD.

61A Hill Street, Roseville, N.S.W. 2069  
PO Box 8, Turramurra, N.S.W. 2074  
Phone: (02) 46 3014 (02) 416 9168  
Fax: (02) 416 9082  
Perth: 28 Windlass Avenue,  
Ocean Reef, W.A. 6027  
Phone: (09) 401 4841

Aggressively structured dealer pricing

NEW  
MAC I & II  
PUBLIC AND  
SHARE SOFTWARE.  
CALL OR FAX FOR CATALOGUE.

# MS-DOS SOFTWARE \$5.00 A DISK

**A COLLECTION OF 1400+ DISKS**

## OUR CURRENT RANGE OF SOFTWARE INCLUDES:

| CATEGORY                | No. | DISKS |
|-------------------------|-----|-------|
| Artificial Intelligence | 9   | Disks |
| Business Applications   | 110 | Disks |
| Computer Education      | 21  | Disks |
| Desktop Managers        | 32  | Disks |
| Entertainment           | 70  | Disks |
| Games                   | 61  | Disks |
| Home Applications       | 50  | Disks |
| Maths/Scientific/Stats. | 44  | Disks |
| Misc./Special Applicat. | 114 | Disks |
| Wordprocessor/Editors   | 73  | Disks |
| DOS/Disk Utilities      | 56  | Disks |
| Misc./General Utilities | 77  | Disks |
| Printer Utilities       | 27  | Disks |
| Bulletin Board Software | 33  | Disks |
| Communications          | 73  | Disks |
| Databases               | 89  | Disks |
| Education               | 44  | Disks |
| Financial Applications  | 45  | Disks |
| Graphic/Drawing         | 51  | Disks |
| Languages               | 79  | Disks |
| Reference Materials     | 31  | Disks |
| Spreadsheets            | 56  | Disks |
| Screen Utilities        | 20  | Disks |
| Encode/Decode Utilities | 56  | Disks |
| Language Utilities      | 37  | Disks |
| Programmer Utilities    | 18  | Disks |

We are adding approx. 30 new disks to the library each month.

S.M.E. Public Domain P/L offers membership in the oldest, and largest collection of public domain software in Australia.

For your \$40 first year membership you receive the latest catalogue (over 200 pages) and monthly catalogue updates and newsletters.

All disks (with an av. 15 programs) are listed in 26 easy-to-find categories.

Cost per disk:

5.25" format Self serve \$5.00 Mail order \$6.00

3.5" format Self serve \$10.00 Mail order \$11.00

**SME**  
**PUBLIC DOMAIN**  
*Established 1976*

**MELBOURNE** 22 Queen Street, Mitcham, Vic. 3132.

Tel: (03) 874 3666 Fax: (03) 873 4086

**SYDNEY** 155 Eldridge Road, Bankstown Tel: (02) 796 3380

RING YOUR NEAREST OFFICE TODAY  
OR WRITE OR FAX YOUR APPLICATION TO:  
**S.M.E. PUBLIC DOMAIN SOFTWARE LIBRARY,**  
22 QUEEN STREET, MITCHAM, VIC. 3121  
PHONE: (03) 874 3666 FAX: (03) 873 4086

Surname ..... First Name .....

Optional Address .....

Street Address .....

Town/City ..... Postcode .....

Phone No. (.....) .....

Payment by Cash ☐ B/Card ☐ Visa ☐ M/card ☐ Cheque ☐

Card Number ..... Expiry Date .....

Signature .....



# GT Power

**Steve Withers and John Della-Torre look at GT Power, the latest addition to the growing number of shareware communications packages.**

Like many shareware products, GT Power began as a private project for its author, Paul Meiners of Houston, Texas, to create a program to satisfy his own communication needs. In January 1987 the program became a shareware product and the current release (14.02) boasts a rich set of features, 12 transfer protocols and a fully fledged host mode for bulletin board operation. Both host and terminal are available in the one 239k program, but a terminal only version is also supplied which is about 60k smaller. Registered users also are provided with three programs for running Netmail between GT systems and a Sysop Tools program for sysop maintenance. It's a very comprehensive package for the registration fee of \$US60.

The terminal mode of GT Power provides the following features:

- support for 12 transfer protocols, including ASCII upload, Kermit and Zmodem. All protocols except Kermit and Zmodem are internal;
- VT-100 terminal emulation;
- multiple phone directories with built-in sort facility;
- up to 200 entries in the circular redialler;
- micro keys with record and playback. Shell to DOS capability;
- a powerful script language with 80 commands to automate logons and up/down loads;
- upload and download counts (in kilobytes) are kept for each bulletin board in each dialling directory; and
- for batch protocols, a 'pick list' from which to choose the files you wish to upload via a popup window.

The host mode (bulletin board operation) provides:

- support for multiple message areas;
- 300-115,000 bps support;
- password and access level security;
- batch doors to allow users to execute any program that operates over a communications link;
- sysop tools for bulletin board maintenance;

- three programs which allow Netmail facilities between participating GT Power bulletin boards;

- a 'Ringback' facility to allow the sharing of the bulletin board with a voice line or answering machine; and

- XON/XOFF flow control.

The first public GT Power bulletin board in Sydney ('The Poet's Dilemma', 804 6412) came online in December 1987 and there are now eight systems in the Sydney GTNet and approximately 300 GT systems worldwide. Sydney systems include 'The Black Hole', the official bulletin board of the NSW branch of the British Astronomical Association; 'Combined Ashton-Tate', the Ashton-Tate User Group bulletin board; and The Australian Trade Commission's board (AUSTRADE) which will service tender and trade enquiries obtained from overseas Trade Commission Posts.

An important addition to the Sydney GTNet is the GTFIDO Gateway written by local GT sysop Stephen de Plater, which allows the transmission of net/echo mail from GT to FIDO systems and vice versa. For example, it is possible for a FIDO system in Adelaide to send a message to a GT system in Sydney or for a Sydney GT system to send a message to a FIDO host in Perth.

John Della-Torre, the sysop of 'The Poet's Dilemma' has made arrangements with the author of GT Power to distribute registered copies in Australia. Anyone wishing to register GT Power or start a GT system can contact John through 'The Poet's Dilemma' (02) 804 6412 or by calling him in person on (02) 85 7782. While anyone with a copy of GT Power may start a bulletin board, participation in the GTNet requires a Net/Nodeid and a CRC.

The GTNet is currently seeking a company sponsorship to offset the costs of international connects to Canada; such offers should be directed to 'The Poet's Dilemma'.

## System news

With acknowledgments to Peter Brewer, Paul Cassidy, John Della-Torre, Geoff Shearsby and Rowan Stevens.

## New listings

### NSW

**Aftermath** (02) 872 5520. 24 hours daily. V21, V22, V23. GTNet 036/010.

**Computrol** (02) 489 6848. 24 hours daily. V21, V22, V22bis, V23. GTNet 036/004.

**Food For Thought** (02) 683 1814. 8.30am-4.30pm, RINGBACK. V21, V22, V22bis, V23. GTNet 036/006.

**Kangaroo Korner** (02) 977 2013.

**Skylab** (02) 831 3823. Paul Cassidy. 8.30pm-5am daily. V21 only.

**Sydney CAE** (02) 660 8272. Geoff Shearsby.

**Outdoors Education** (046) 66 8253. 7.30am-7.30pm, RINGBACK. V21, V22, V23.

### Vic

**CADPhone** (03) 890 0091. Dan Moane. 24 hours daily. V21, V22.

**Delta** (03) 793 4548. 'Big Mother'. 24 hours daily. V21, V22, V22bis, V23.

**Doodz Domain** (03) 646 5861. Scott Rigby. 24 hours daily. V21, V22, V22bis, V23.

**Dr Blaze** (03) 890 9323. Ron Lyth. 24 hours daily. V21, V22, V22bis, V23. FidoNet 632/344.

**MacLink** (03) 772 4098. Roger Harris. 24 hours daily. V21, V22, V22bis, V23.

**Nostromo** (03) 772 6542. Andrew Maggio. 24 hours daily. V21, V22, V23.

**Peninsula Colour Computer Club** (03) 551 5131. Stan Blazejewski. 8.30pm to 7am daily. V21 only.

**Wesley College** (03) 522 7275. Robert Swaab. After 5pm weekdays, 24 hours weekends. V21, V22, V22bis, V23.

**Zen** (03) 899 6180, (03) 899 6191 and

(03) 899 6201. Craig Bowen. 24 hours daily. V21 only. Also on (03) 899 6184, V21, V22, V22bis, V23.

**Dragon City** (054) 47 0398. Mal Fields. 24 hours daily. V21, V22, V22bis, V23.

## Qld

**Coelurus** (075) 63 2621. Peter Brewer. 6pm-8am weekdays, 24 hours weekends. FidoNet 640/601.

## Updates

## Vic

**Amiga Limits** (03) 725 2895. Peter Dorrell. 24 hours daily. V21, V22, V23.

**Big Tedd's** (03) 509 6067. Rob Bates. 24 hours daily. V21, V22, V23.

**Brainstorm** (03) 758 7086. Rowan Stevens. 23 hours daily. V21, V22, V22bis, V23. FidoNet 632/322.

**Cave 76** (03) 836 6976. 'The Avatar'. 6pm-10am daily. V21, V22, V22bis, V23.

**Crossover** (03) 367 5816. 'Night Stalker'. 24 hours daily. V21, V22, V22bis, V23.

**Crystal Palace** (03) 725 1923. Chris Brunton. 24 hours daily. V21, V22, V22bis, V23.

**Custom Programming** (03) 848 3331. MV. Alan Williamson. 5.30am-7pm, 8pm-1.30am daily. V21, V22, V22bis, V23.

**Down Under Amiga** (03) 755 1584. Greg Hudson. 23 hours daily. V21, V22, V22bis, V23.

**East Suburb Eighty Users Group** (03) 819 5179. Martin Axford. 24 hours daily. V21, V22, V23. FidoNet 632/347.

**Eastwood** (03) 870 4623. MV. Mick Stock. 23 hours daily. V21, V22, V23. FidoNet 632/343.

**Electric Dreams** (03) 813 1663. Peter Studley. 24 hours daily. V21, V22.

**Engbase** (03) 29 6336. Greg Furlong. 24 hours daily. V21, V22, V23.

**Graveyard** (03) 706 7902. Jason Caley. 24 hours daily. V21, V22, V22bis, V23.

**Krime Philes** (03) 743 0324. 'Renegade'. 24 hours daily. V21, V22, V22bis, V23.

**Labyrinth** (03) 318 6562. Stephen Jones. 23 hours daily. V21, V23. CompuNet: 635/5.

**Melbourne PC-User Group** (03) 819 5392 and (03) 819 6469. Charles Sandercock and Colin Macauley. 23 hours daily. V21, V22, V22bis, V23. FidoNet 632/323.

**Melbourne PIE** (03) 877 5568, (03) 878 5743 and (03) 878 3672. P. Len Gould. 24 hours daily. V21, V22, V22bis, V23.

FidoNet 632/351.

**Mesa** (03) 563 9102. David Woodberry. 23 hours daily. V21, V22, V23. FidoNet 632/349.

**MICOM** (03) 758 8642. Peter Jetson. 23 hours daily. V21, V22, V22bis, V23. FidoNet 633/271.

**Motel International** (03) 509 9611. Kim and Ruth Graton. 24 hours daily. V21, V22, V22bis, V23.

**Real Connection** (03) 288 0331. C Miller and J Perry. 24 hours daily. V21, V22, V23. Also on (03) 288 0810, V21, V22, V22bis, V23. CompuNet 635/2.

**Software Bank** (03) 820 1632. Simon Walsh. 23 hours daily. V21, V22, V22bis, V23. FidoNet 632/340.

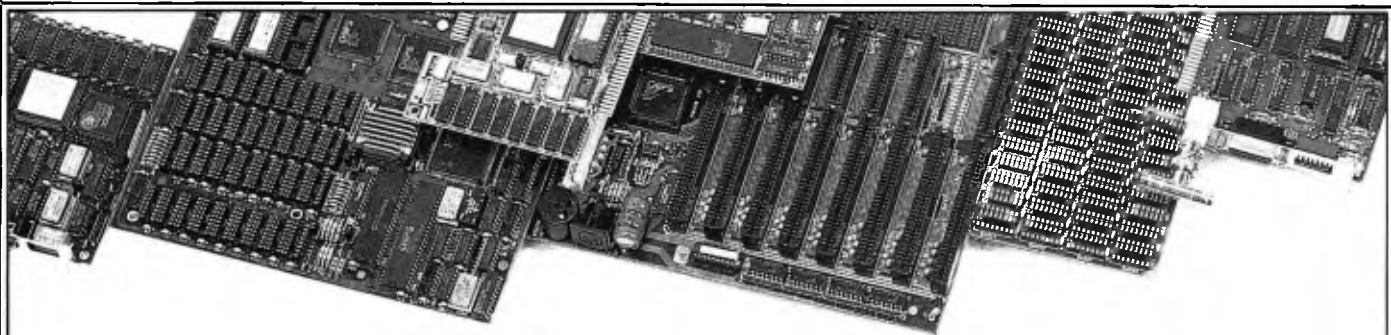
**Southern Mail Centre** (03) 725 1621. Maurie Halkier. 5am-7pm, 8pm-4am daily. V22, V22bis.

**Telegraph Road BBS** (03) 743 6173. Darren Moore. 24 hours daily. V21, V22, V22bis, V23.

**Thongheads Welfare** (03) 419 2385. John Thonghead, Max Ruby and Queen Bee. 10pm-6pm weekdays, 24 hours weekends and public holidays. V21, V22, V22bis.

**Bayside** (052) 53 1110. MV. George Plebanowicz. 23 hours daily. V21, V22, V22bis, V23. FidoNet 632/313.

END



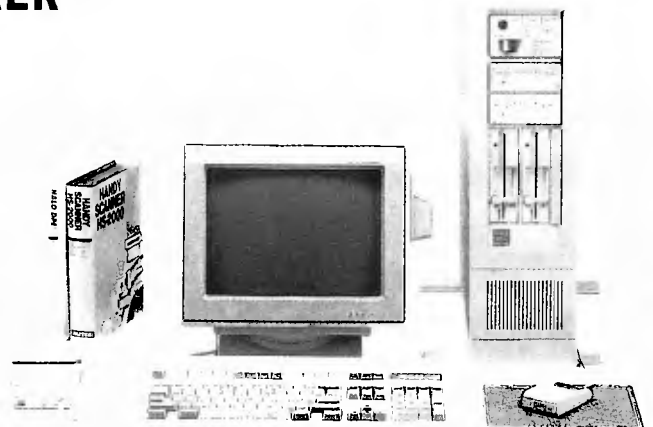
## SERIOUS ANNOUNCEMENT FROM SERIOUS MANUFACTURER

COMPUTER BUSINESS ISN'T JUST FUN. IT'S A SERIOUS GAME, FOR SERIOUS PLAYERS. WE ARE SERIOUS IN THIS BUSINESS THAT WE INVITE SERIOUS PARTNERS.

QUALITY PRODUCTS AND PUNCTUAL SHIPMENTS AREN'T ENOUGH TO JUSTIFY OUR SERIOUSNESS, WE BACK THEM UP WITH SERIOUS SERVICES.

## ALLTEK COMPUTER CO., LTD.

2FL., NO.35, CHUNG-HSIAO E. RD., SEC. 1, TAIPEI, TAIWAN, R.O.C.  
TEL: 886-2-3947552 TLX: 19179 ALLTEKCO FAX: 886-2-3218100



# NOW!

*All other modems are obsolete.*

## *Announcing Maestro 2400 ZXR*



The first 2400 Baud intelligent modem under \$800. Half that price in fact. This is a revolutionary modem with features unmatched by modems costing four times the price. The performance of the Maestro 2400 ZXR is superior to any 2400 Baud modem currently on the market. Features:

- \* V21, V22, V23 and V22bis CCITT and BELL
- \* Auto-answer, auto-dial, auto-disconnect, auto baud rate sense
- \* Pulse and Tone dialling \* Call progress monitoring
- \* Optional 8K battery backed RAM expandable to 32K with unlimited access (Superior to limited access non-volatile RAM) \* Forth on board
- \* Local and/or remote test capability
- \* Full Hayes AT 2400 compatibility with over 40 registers
- \* Australian designed and manufactured with 6 mths full warranty
- \* Uses lightning fast ZILOG 20 MHz Super 8 uP Z088020 which outperforms all existing 2400 Bd modem microprocessors
- \* And best of all is the price:

## 2400 Baud for \$399.

*Now you can halve your communications cost.*

The Maestro 2400 ZXR has **EVERYTHING** you could want in a modem for home or small business use. It effectively renders obsolete all existing modems. Why would you buy any other modem?

Don't be fooled by the price. Maestro deliberately set about to create a modem that would capture the lion's share of the market and with their aggressive pricing and high volume production they should achieve their goal. Already, and the modem has been on the market for a fortnight, they have received orders for 1000 units from a government department, and 500 units from a corporate client. This is an unprecedented response and recognises the remarkable value for money and features of this modem.

If you would like to double your communications speed best ring now and order your modem. If you wait you may be joining a long queue!

---

## ORDER FORM

Dear George,

Please rush me the following: \_\_\_\_\_

Enclosed please find cheque/ Purchase order/ Bankcard/ M/C / VISA # \_\_\_\_\_

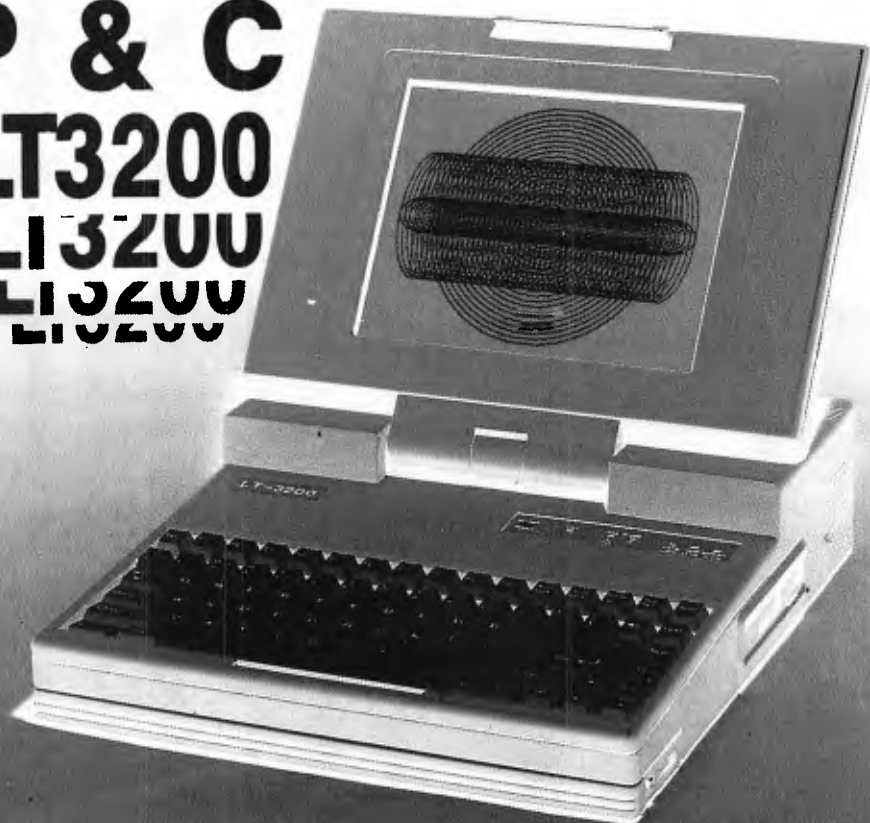
for \$ \_\_\_\_\_ (Remember to add \$4 post or \$8 courier.)

NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_



**P & C**  
**LT3200**  
**LI3200**  
**LI3200**



IBM-AT Compatible

**high  
 speed  
 high  
 performance  
 Laptop**

80286, 6/12 MHZ clock  
 1.44 MB 3-1/2" Floppy  
 Drive  
 20/30/40 MB Hard disk  
 640x400 high resolution  
 Plasma Display



**P & C SHITEN  
 ENTERPRISE CO., LTD.**

RM 7, 8 FL., NO. 100,  
 ROOSEVELT RD., SEC. 3, TAIPEI,  
 TAIWAN, R.O.C.  
 P.O. BOX: 30-291, TAIPEI,  
 TAIWAN, R.O.C.  
 CABLE: PCSHITEN  
 TEL: (02)395-1400  
 TLX: 19206 PCSHITEN  
 FAX: 886-2-3512073

IBM PC/AT\* are registered trademarks of IBM

## EVER FOR EXCELLENCE 80386 & 80286 COMPUTER SYSTEMS

### **FBU System**

#### **Baby 286**

- \* 80286 CPU, 1MB RAM on Board  
 6/8/10/12/16 MHz, Selectable by Software  
 & Hardware
- \* Expandable to 4MB With EMS Function (Optional)
- \* Rechargeable Battery

#### **FBU System 386**

- \* 80386 CPU, 2MB on Board  
 6/16/20/25 MHz, 0 Wait State,  
 Selectable by Software & Hardware
- \* Optional: Intel 80287 & 80387 Math Coprocessor

PS/2 Model 30,50,60 compatible available.  
 CONTACT US TODAY FOR FULL DETAILS!

**FBU®**

**MANUFACTURER & EXPORTER  
 FAMOUS BUSINESS UNITED  
 INTERNATIONAL INC.**

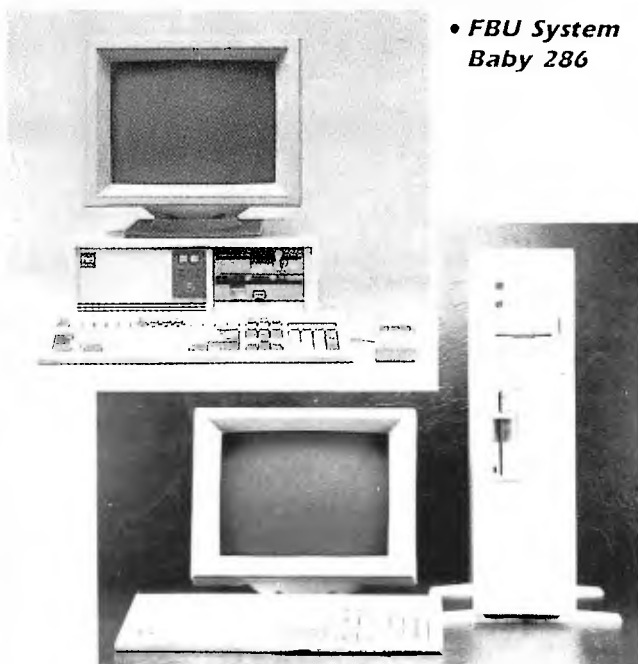
12F-3, 391, Sec. 4, Hsinyi Rd.,

Taipei, Taiwan, R.O.C.

Tel: 886-2-701-6890, 754-2535

TLx: 26768 FGIND Fax: 886-2-7044170

### • **FBU System Baby 286**



• **FBU System 386**



## LETTERS

**This is your chance to air your views — send your letters to APC, 124 Castlereagh Street, Sydney 2000; or contact us via Microtex on Telecom's Viatel, page 666.**

### **Sprint — what went right?**

Thank you for your article on Sprint (Newsprint, APC October). It helps to know that others are having the same troubles with it. I have as yet been unable to even install it using its own install feature. I run DOS 2.11 on a Bondwell BW8 laptop with two 720k's and an external 5.25in drive.

The program will not copy the correct files over to the correct work disks, it just gives an error message of not enough memory or bad disks. So, in order to install it I had to run the install program and see what files should go where and then manually install the three 720k disks.

The only problem is that it does not tell me when to insert the other disks — only an error message and press Esc! This is OK as I am able to work out when to insert the 'spell' disk in between red lights, but it is impossible to add new words to the dictionary as it does this when you leave the program — and to do that you must have the program disk in the a: drive. When I try to install another dictionary such as the US dictionary, it just crashes with the DOS message 'divide overflow'!

I have not been able to try any of the wonderful features that Guy Kewney has had trouble with, but I'm sure they will be double on a two-floppy system.

I am going back to WordPerfect 4.2. I have written to Borland, but I do not like my chances of getting a satisfactory reply. Just another pig in a poke program that I will have to live with I guess.

**E Montague**

### **Gambling man**

The artist for the front cover of the August edition of APC obviously is not a gambler — or he would not have drawn the three and the four on adjacent sides of the dice.

**P Stevenson**

### **It's just not cricket**

Why is cricket rarely implemented on a computer? I remember about three versions written for the Spectrum; all were pretty dire both in graphics and gameplay, and quite unacceptable these days.

One can only imagine what 16 bits and half a megabyte could do for a cricket simulation. In fact, it might turn out to be the *only* way to beat the West Indies.

**R Alexander**

### **Circuit copy**

I was interested to read Nick Walker's article, 'Breaking the sound barrier' (APC August). Unfortunately, the circuit he gives for a simple digital-to-analogue converter is incorrect. An op-amp in a negative feedback circuit of this type will try to make the voltages on its two inputs equal. In the circuit shown, the larger the number to be converted, the more switches will be closed, so the lower the resistance between the output and the inverting input terminal, and the less the output is required to pull that input up to the reference voltage on the other input.

When the number to be converted is zero, all the switches are open and the output would be at some undefined value a little below the positive supply rail.

I think the circuit Mr Walker intended to show is the one below. The op-amp will keep the inverting input at earth potential, and the current flowing in through  $r$  is equal to that leaving through the bank  $R$ ,  $2R$ ,  $4R$  and  $8R$ . Thus, if  $x$  is the binary number being converted, and 1s are represented by closed switches:  $I_1 = V_{out}/r = I_2 = x V_{ref}/R$  so  $V_{out} = x V_{ref} r/R$ .

**J Linfoot**

### **Backward step**

For those contemplating upgrading from WordPerfect 4.2 to 5.0, let me offer some words of caution.

Version 5.0 seems to have lost the useful facility for telling the printer which range of pages you wish to print. You can now only ask it to print a whole document or just the page you are on. This is irritating if you need to revise text in the light of new information.

More troublesome still is that those who use WordPerfect to prepare text for Ventura are forced to save their text in 4.2 format. If you try to send a document saved in 5.0 format to Ventura, you end up with gibberish.

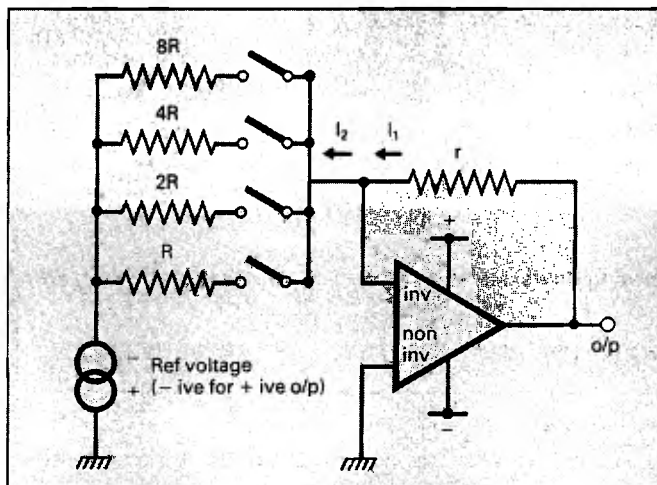
One could argue that WordPerfect is getting closer to a desktop publishing package, but in fact it is miles away from the ease of use and range of Ventura. Equally, one still needs a good word processor to prepare text for Ventura. Although I appreciate some of the new features of WordPerfect 5.0, I cannot understand why they have had to save the specifications of the printer with each file.

This feature seems to alter the way WordPerfect files work with other packages such as Ventura. If, like me, you have a range of printers for different purposes, then the specifications for the printer are irrelevant to the document you are processing.

The upgrade was a mixed blessing — and the feeling is that it has proved to be more trouble than it is worth. This is even more so when we have to let colleagues, who have not upgraded, view our files. WordPerfect 4.2 cannot read version 5.0 files — unless they have been deliberately saved in 4.2 format. So it's two steps forward and two steps back!

**T Klouda**

END



## MICROSCIENCE COMPUTERS

### MICROSCIENCE PC/XT Compatible with

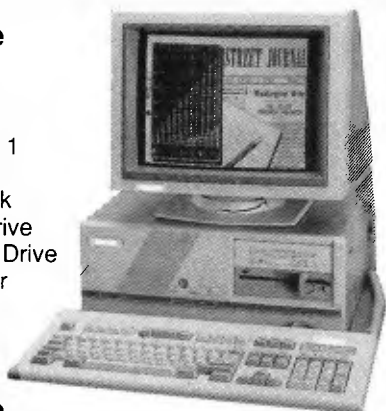
- 640 KB RAM
- 10 MHz Turbo
- 1 Serial, 1 Parallel & 1 Game Port
- Battery Backed Clock
- 360K Floppy Disk Drive
- 21 MByte Hard Disk Drive
- Hi Res Mono Monitor
- 101 Key Keyboard

**\$1695**

### MICROSCIENCE PC/AT Compatible with

- 640 KB RAM Memory
- 1.2 MByte Floppy Drive
- 1 Serial, 1 Parallel Port
- 40 MB Hard Disk
- Battery Backed Clock & Calendar
- Hi Res Mono Monitor

**\$2295**



### PRINTERS

|                         |        |
|-------------------------|--------|
| LQ 1050 + Cable + Paper | \$1560 |
| FX-800 + Cable + Paper  | \$575  |
| LX-800 + Cable + Paper  | \$425  |
| LQ-500 + Cable + Paper  | \$650  |

### ACCESSORIES

|                        |        |
|------------------------|--------|
| Joystick               | \$30   |
| Printer Stand          | \$35   |
| DS DD Disks (10) 5.25" | \$6.95 |
| DS DD Disks (10) 3.5"  | \$21   |
| Genius Mouse, GM 6     | \$95   |

### HARD DISKS

|                            |        |
|----------------------------|--------|
| Rodine 53Meg               | \$1050 |
| Miniscribe 20Mb + Cont     | \$475  |
| Miniscribe 30Mb + Cont     | \$525  |
| Miniscribe 40Mb + Cont     | \$650  |
| Miniscribe 44Mb V/C + Cont | \$975  |
| Miniscribe 70Mb V/C + Cont | \$1150 |

### MONITORS

|                               |       |
|-------------------------------|-------|
| Intra 12" (Green/Amber/White) | \$150 |
| Intra 14" (Green/Amber/White) | \$180 |
| TVM MD-3                      | \$530 |
| TVM MD-700                    | \$750 |
| TVM MD-11 Multisync           | \$950 |
| ADI VGA Analog                | \$895 |
| Synco EGA                     | \$750 |
| Synco CGA                     | \$530 |



**THE MICROSCIENCE JINGLE COMPETITION**  
HURRY! HURRY! DROP IN AT YOUR NEAREST  
MICROSCIENCE STORE AND PICK UP YOUR  
ENTRY FORM.

All prices include Sales Tax.

Opening Hours: Mon-Wed: 9am - 5.30pm, Thurs: 9am - 7pm, Fri:  
9am - 5.30pm, Sat: 9am - 1pm.

AVAILABLE FROM:

## MICROSCIENCE COMPUTERS

| MOORABBIN                                                | ST KILDA                                           | ESSENDON                                         | GEELONG                                          |
|----------------------------------------------------------|----------------------------------------------------|--------------------------------------------------|--------------------------------------------------|
| 920 Nepean High-<br>way, Vic 3199<br>Ph: (03) 553 2644   | 106 St. Kilda Rd,<br>Vic 3182<br>Ph: (03) 525 4114 | 2618 Keilor Rd,<br>Vic 3040<br>Ph: (03) 379 3189 | 36 Aberdeen Rd,<br>Vic 3218<br>Ph: (052) 221 999 |
| BOX HILL<br>39 Carrington Rd, Vic 3128 Ph: (03) 890 8166 |                                                    |                                                  |                                                  |

## C.H. WANG & CO. PTY LTD

### EDGE-AT

- 640K RAM EXTENDABLE TO 4MB
- 6/10 MHZ TURBO SWITCHABLE
- DTC HDD/FDD CONTROLLER
- 1.2 MB FLOPPY DRIVE
- 20 MB HARD DISK
- AT I/O CARD
- 101 KEYBOARD
- ONE YEAR WARRANTY

**ONLY \$2199 INC TAX**

### EDGE-XT

- 640K RAM 8MHZ TO 10MHZ TURBO
- 2 X 360K FLOPPY DRIVE
- MULTI I/O (FD, PAR, SER, GAME, CLK)
- 84 KEYBOARD
- COLOUR OR MONO CARD
- ONE YEAR WARRANTY

**ONLY \$1099 INC TAX**

### MONITORS

|                              |       |
|------------------------------|-------|
| TVM MD-7 EGA 0.31MM          | \$680 |
| SAMSUNG CW 4656 14" CGA      | \$420 |
| SAMSUNG MA 2563 12" MON. TTL | \$150 |

### PRINTERS

|                                      |       |
|--------------------------------------|-------|
| STAR NX-1000                         | \$408 |
| HYUNDAI HDP-910 9 PIN 80 COL 180CPS  | \$360 |
| HYUNDAI HDP-920 9 PIN 136 COL 180CPS | \$540 |

|                                 |       |
|---------------------------------|-------|
| WITTY MOUSE C/800               | \$70  |
| SONY 1.44MB 3.5 FLOPPY DRIVE    | \$220 |
| ULTIMATE EGA CARD (640 x 480)   | \$250 |
| TANDON 20M HARD DISK            | \$384 |
| VENUX 5.25 D.D DISKETTE 10 PACK | \$8   |

DEALER ENQUIRIES WELCOME

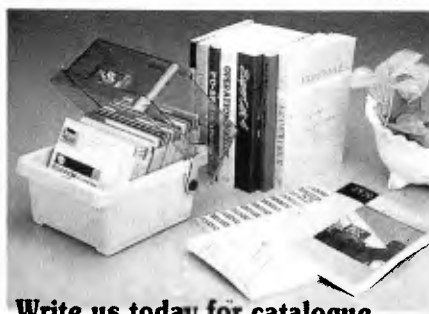
CALL FOR BEST PRICE

8 CLIVE STREET, EAST ROSEVILLE, NSW 2069  
P.O. BOX K570 HAYMARKET, NSW 2000

PH: (02) 417 7842 FAX: (02) 417 7743

## HARDWARE SOFTWARE & BOOK CENTER

IBM PC/XT/AT Compatible  
80386, 80286, 8088  
microprocessor



**"SOFTWARE BANK"**

about 4500 species of software  
program we have

Write us today for catalogue



**FORMOSA L&M ENTERPRISE CO., LTD.**

P.O. Box 27, Taipei, Taiwan, R.O.C.

Telex: 10760 LFORMOSA

Cable Address: "LFORMOSA" Taipei

Fax: 886-2-7080089

PC/XT, PC/AT, Baby AT and PS/2 are trademarks of the International Business Machines Corp



*This month our specialist reviewers examine books on popular databases, plus there's some general reading also.*

## **dBASE III Plus Multi-user Applications**

**Author:** Richard Baker  
**Publisher:** Thomas Nelson  
**ISBN:** 0-8306-2908-4  
**Price:** \$39.95

This book describes how to develop network applications for dBASE III Plus using the dBASE Administrator program. It is for those with considerable programming experience with the dBASE programming language who want to develop applications involving multiple use of the same data resource on a Local Area Network (LAN).

Three particular aspects of multi-user dBASE III Plus are discussed in great detail. These are: prevention of conflicts between individual users (caused by simultaneous use of the same file, simultaneous use of the same record and the 'deadly embrace' which occurs when two users lock a file or record and then try to access the resource controlled by the other user); maintenance of accuracy of data; and maintenance of data security.

The author supplies short dBASE programs to cover the first two of these points. A fictitious step-by-step example is used to show how the program PROTECT supplied on the dBASE III Plus Administrator disks can offer data security at three levels: at the point of access to the dBASE program by use of passwords; at the point of file access by use of access levels; and by allowing data files to be encrypted. Users needing to comply with various security requirements will find this section particularly useful.

Over half of the book is taken up with long program listings for multi-user applications, including employee appraisal, inventory files, order entry and invoicing. However, the applications are specifically American and would need to be modified for Australian use.

The author gives a variety of hints and



tips for the smooth running of dBASE on a network, including a chapter on networking with dBASE compilers (Clipper, FoxBase+, Quicksilver) for those who need short response times. He emphasises the problems that can arise and suggests solutions to many of them, but warns the reader that 'when computer users first began to install LANs, the author of Murphy's Law struck a deal with the primary sponsor of Catch-22. They've had an active partnership since then'.

'dBASE III Plus Multi-user Applications' is essential reading for anyone contemplating setting up multi-user applications with dBASE III Plus. It will either persuade them to keep their computer as a standalone system or help them to avoid the pitfalls associated with networking and to produce efficient, reliable

and secure multi-user applications software. Networking with dBASE IV, when it is available, (see the review in APC, June) will be based on the SQL programming language, and will contain many additional features to assist in the development of multi-user applications. It is not covered by this book.

**Dr R Stoneham**

## **A Guide to DB2**

**Authors:** CJ Date and CJ White  
**Publisher:** Addison-Wesley  
**ISBN:** 0-201-09428-2  
**Price:** \$45.95

DB2 is not dBASE. DB2 is IBM's mainframe relational database software. DB2 would be of minimal significance to APC readers were it not for one fact: the OS/2 extended edition will include a

# Brighter and Clearer than any anything you've known!

**OEM Specialist in Color/Mono Display**  
**New VGA Monitor for**  
**IBM PS/2, 30, 50, 60, 80**  
**FCC Approved**

**FOR MDPZ/CGA/EGA/VGA AND  
OTHER SYSTEMS.**

**Inverse switch reverse white and  
black images/dual frequency monitor.**  
**Colors: green, amber,  
switchable monitor**



**MONO 15", 90°, FLAT,  
HIGH RES. NON-GLARE**

|              |           |
|--------------|-----------|
| Monochrome   | CH-1513N  |
| Dual         | CH-1523N  |
| Mono Reverse | CH-1503R  |
| Dual Reverse | CH-1523R  |
| VGA          | CH-1503P  |
| VGA Reverse  | CH-1503PR |



**MONO 15", 90°, FLAT,  
HIGH RES. NON-GLARE**

|              |           |
|--------------|-----------|
| Monochrome   | CH-6513N  |
| Dual         | CH-6523N  |
| Mono Reverse | CH-6503R  |
| Dual Reverse | CH-6523R  |
| VGA          | CH-6503P  |
| VGA Reverse  | CH-6503PR |



**MONO 14", 90°, FLAT,  
HIGH RES. NON-GLARE**

|              |           |
|--------------|-----------|
| Monochrome   | CH-7413N  |
| Dual         | CH-7423N  |
| Mono Reverse | CH-7403R  |
| Dual Reverse | CH-7423R  |
| VGA          | CH-7403P  |
| VGA Reverse  | CH-7403PR |



**MONO 14", 90°, FLAT,  
HIGH RES. NON-GLARE**

|              |          |
|--------------|----------|
| Monochrome   | CH-1413N |
| Dual         | CH-1423N |
| Mono Reverse | CH-1403R |
| Dual Reverse | CH-1423R |
| VGA          | CH-1403P |



**COLOR 14" MON-GLARE**

|                 |          |
|-----------------|----------|
| CGA 0.42mm      | MC-8403T |
| CGA 0.39mm      | IC-8403T |
| EGA 0.31mm      | HC-8423T |
| VGA 0.31mm      | HC-8413P |
| VGA Plus 0.31mm | HC-8423P |



**COLOR 14" MON-GLARE**

|                 |          |
|-----------------|----------|
| CGA 0.42mm      | MC-9403T |
| CGA 0.39mm      | IC-9403T |
| EGA 0.31mm      | HC-9413P |
| VGA Plus 0.31mm | HC-9423P |



Manufacturer & Exporter

**CHIH HOU ELECTRONICS CO., LTD.**

Office: Room 6C01 No. 5, Sec. 5, Hsinyi Road Taipei 10509  
 Taiwan R.O.C. (Taipei World Trade Center Exhibition Hall)  
 Tel: 886-2-7252981/2 Fax: 886-2-7251993  
 Telex: 51149 CHIHENHOU

Fty: 172-1, Chung Cheng Rd., Ta Ya Hsiang,  
 Taichung Hsien, Taiwan. R.O.C.  
 Tel: 886-45-672770/9. Fax: 886-45-672700.  
 Telex: 51149 CHIHENHOU.

IBM PC 2 is a registered trademark of International Business Machines Corp.

database manager that is compatible with DB2 and its command language SQL. As such, DB2 will be a key application package of the near future.

The book assumes no prior knowledge about relational databases. It starts with an introduction to the concept of relational databases and relational processing before launching into a detailed description of the SQL (Structured Query Language) used to interrogate the database. There follows a series of chapters demonstrating the features of DB2 through the design and refinement of a supplier and parts database. This technique works very well. The application is simple enough to be understood yet sophisticated enough to be realistic. Date and White cleverly introduce more DB2 features as restrictions of the currently developed solution are exposed.

The second half of the book covers, in detail, related products to DB2. This section is less relevant to the PC-oriented reader as the majority of these packages run under IBM's mainframe operating systems. The book concludes with a discussion on the future of DB2 and a number of technical appendices about DB2 and relational algebra.

This book is extremely well written. A lot of thought and expertise has been applied in order to arrive at a thorough treatment of the underlying principles, which is nevertheless easily comprehensible.

Since DB2 is going to be a major part of OS/2, irrespective of its merits it is going to succeed. Microcomputer professionals will have to understand DB2. This book offers a lucid and thorough introduction to the database standard of tomorrow.

**Dr S Jones**

## Understanding R:Base System V

**Author: Alan Simpson**  
**Publisher: Methuen**  
**ISBN: 0-89588-394-5**  
**Price: \$43.95**

R:Base System V is essentially Microsoft's answer to dBASE III Plus. It is a powerful and complex system, providing a wide range of database management facilities on the IBM PC range.

Simpson's book is aimed at those who need a thorough understanding of R:Base and are starting from square one. So it begins with a fairly conventional, though rather short, introduction to databases and to simple R:Base terminology such as tables. The first 12 chapters develop these topics, first using 'flat files', where R:Base is dealing with

just a single file for each application. Later, multiple-linked files are introduced, along with more complex forms of reporting. These are two of the most difficult areas to explain to novices, and Simpson handles them quite well.

The remainder of the book is concerned with complete applications, thus meeting the frequent criticism that introductions to a package rarely deal with the sum of the parts as well as the components. In the process, Simpson explores the development of a complete application, including listings, which can be obtained on disk if you really want to try the application out properly without much boring error-prone re-keying. It's a pity the address on the order form for the disk is in California.

It's also rather a shame that the example application is an accounts receivable/ordering system. We, and the Americans, may be two nations divided by a common language, but there is no need to show it so emphatically by choosing an application in the accounting field, which is so likely to be dependent on national law and customs.

Nevertheless, the book does take a sensible approach, and on the whole succeeds in its aims. And while \$43.95 seems a lot for a paperback, I suppose that if you're spending hundreds on the software it's hardly a big percentage extra.

**Dr K Lang**

## General

### Basic Systems Analysis

**Editors: Alan Daniels and Don Yeates**  
**Publisher: Pitman**  
**ISBN: 0-273-02931-2**  
**Price: \$29.95**

Written with the novice to systems analysis in mind, this book explores fully the long and sometimes laborious rules of a systems analyst's profession. The painstaking business study and fact finding — that is: 'Do you really need that report that has been propping up the coffee machine for the last quarter?', the feasibility study, the systems analysis and design, the programming and acceptance testing, the (dreaded) implementation and the (most important) post implementation review. There you are, and all you thought they did was arrive late, have expensive lunches and go home early.

This is the third edition of a much valued book. There are nearly 400 pages of diagrams, flowcharts, decision tables, organisation charts and highly in-

formative text. This edition includes newer topics such as fourth generation languages, local area networks, security, database management and Structured Systems Analysis and Design Methodology (SSADM) with an excellent case study in chapter 17.

All in all, it's a good read, well presented and containing valuable information.

**L Kyle**

### Running MS-DOS

**Author: Van Wolverton**  
**Publisher: Penguin**  
**ISBN: 1-55615-116-0**  
**Price: \$34.95**

One of the first sentences that I read about this book, 'Running MS-DOS' by Van Wolverton, was that BYTE magazine called it 'simply the definitive handbook of PC/MS-DOS', followed by the US edition of PC Week stating that 'it is written by a human being, for human beings, in a strange and wonderful tongue: English'. All I can really do is combine those two statements and agree and agree and agree. There is nothing to fault about this book: it is clear, simple, beautifully presented and I even liked the smart mauve ink used in diagrams, headings and some illustrations. The book is concise, interesting, and basically, in a class of its own.

To fill you in on the contents, it's everything you ever wanted to know about DOS plus information on the little-used version 4 and helpful notes about hard disk management.

Split into three parts, Part One defines basic terms and concepts and introduces you to DOS via copious examples. It doesn't waste time overlapping with the DOS manual which would have been supplied with your software, but still you are never left feeling that something has passed you by. Everything is explained clearly and via step-by-step examples.

Part Two could be considered the main hub of the book because it contains all the meaty chapters on, for example, managing your files, managing your fixed disk, using Edlin, creating commands, taking control of your system, and DOS and local area networks.

Finally, Part Three romps home with five appendices including a glossary and a DOS command reference.

I was so conscious of what a superlative book it is and it 'felt' so nice that I actually did leave it on my coffee table to encourage friends to look at it. Was I going too far?

**L Kyle**

END



# DISCWARE

**NEC Multisync**

**\$call**

**Vega VGA**

**\$475**

**Framework 3**

**\$890**

**Lotus Agenda**

**\$590**

**Fujitsu DL 3400'**

**\$1199**

**Fujitsu DL 2600**

**\$1825**

**Diconix 150 ink jet**

**\$call**

**FoxBase + Multiuser**

**\$550**

**Plus Hardcard 40**

**\$1450**

**Intel Above Board 286**

**\$870**

**J-Laser Plus AT**

**\$950**

**Pagemaker 3**

**\$call**

## IBM SOFTWARE

|                          |        |
|--------------------------|--------|
| Coda .....               | \$350  |
| dBase 4 .....            | \$call |
| DS Backup Plus .....     | \$150  |
| Fastback .....           | \$210  |
| Freelance Plus .....     | \$715  |
| Harvard Graphics .....   | \$595  |
| Lotus 123 .....          | \$649  |
| Magician .....           | \$290  |
| Microsoft Excell .....   | \$799  |
| Mirror with Viatel ..... | \$115  |
| Quattro .....            | \$299  |
| Paradox 2 .....          | \$895  |
| Supercalc 5 .....        | \$call |
| Sidekick Plus .....      | \$275  |
| Symphony .....           | \$975  |
| Timeline 3 .....         | \$890  |
| Turbo Pascal 3 .....     | \$130  |
| Turbo Basic .....        | \$130  |
| Turbo C .....            | \$130  |
| Turbo Toolboxes .....    | \$130  |
| Turbo Prolog .....       | \$130  |
| Ventura Publisher .....  | \$call |
| Word Perfect 5 .....     | \$599  |
| Wordstar 5 .....         | \$450  |

## STORAGE SYSTEMS

|                                |        |
|--------------------------------|--------|
| Seagate 30MB RLL .....         | \$490  |
| Seagate 45MB voice coil .....  | \$890  |
| Miniscribe 42MB .....          | \$675  |
| Microscience 44MB v coil ..... | \$990  |
| Caching HD controler .....     | \$2350 |

## MODEMS

|                           |        |
|---------------------------|--------|
| NetComm AutoModems .....  | \$call |
| NetComm SmartModems ..... | \$call |
| NetComm' In/Modems .....  | \$call |

## IBM ADD ONS

|                          |        |
|--------------------------|--------|
| Hyperformance 12.5 ..... | \$1290 |
| Intel 80287 .....        | \$299  |
| Intel 80387 .....        | \$799  |
| Hypertec boards .....    | \$call |
| 3.5 1.44MB drives .....  | \$350  |

## PRINTERS

|                       |        |
|-----------------------|--------|
| Fujitsu range .....   | \$call |
| Epson range .....     | \$call |
| Toshiba range .....   | \$call |
| Brother range .....   | \$call |
| NEC *new* range ..... | \$call |

**Vega VRAM**

**\$call**

**Intel 386PC**

**\$1490**

**Hyperace 286 Plus**

**\$625**

**Complete Fax**

**\$990**

## LASERS

|                         |        |
|-------------------------|--------|
| Ultra Laser .....       | \$call |
| Toshiba PageLaser ..... | \$call |
| AST Postscript .....    | \$call |
| Epson GQ3500 .....      | \$2890 |
| NEC Silentwriter .....  | \$call |



**DISCWARE**

**(02) 212-6933**

**150 Broadway, Broadway, NSW 2007. FAX: 211-4065 TLX: AA23509**

ALL PRICES INCLUDE SALES TAX AVAILABILITY MAY BE LIMITED AT PRICES ADVERTISED PRICES APPLY TO STOCK HELD AS AT 21/10/88.

# DISCWARE

THE DISCWARE AT-286 - \$3095

THE DISCWARE 386-40 \$4995

|               |                                                      |
|---------------|------------------------------------------------------|
| CPU:          | 80286, 8/10 MHz                                      |
| RAM:          | 640 KB                                               |
| ROM:          | IBM AT compatible.                                   |
| DISK STORAGE: | 1.2 MB Floppy Drive,<br>40 MB Hard Disk.             |
| EXPANSION:    | 6 x 16 bit slots. 2 x 8 bit slots.                   |
| INPUT/OUTPUT: | Parallel/Serial.                                     |
| POWER:        | 225 watt power supply.                               |
| OPTIONS INC:  | Mono or Colour Card. Key Lock<br>12 months warranty. |

LIMITED QUANTITY AVAILABLE AT THIS PRICE



|               |                                                      |
|---------------|------------------------------------------------------|
| CPU:          | 80386                                                |
| RAM:          | 1 MB                                                 |
| ROM:          | Phoenix                                              |
| DISK:         | 1.2 MB                                               |
| STORAGE:      | 40 MB                                                |
| EXPANSION:    | 8 Slots                                              |
| INPUT/OUTPUT: | Serial/Parallel<br>101 keyboard<br>12 month warranty |

Monitor not included

## TOSHIBA T5100/T5200/T3200

| MODEL | T5100       | T5200               | T3200      |
|-------|-------------|---------------------|------------|
| CPU:  | 386 16MHz   | 386 20MHz           | 286 12 MHz |
| RAM:  | 2 MB        | 2 MB                | 1 MB       |
| DISK: | 1.44 40MB   | 1.44 100MB          | 720KB 40MB |
| I/OS: | Ser/Par/Exp | Ser/Par/Exp/2 slots |            |

## Pericomp 386

|               |              |              |
|---------------|--------------|--------------|
| MODEL:        | 386/16       | 386/20       |
| CPU:          | 386 @ 16 MHz | 386 @ 20 MHz |
| RAM:          | 1 MB         | 1 MB         |
| DISK STORAGE: | 1.2 + 80 MB  | 1.2 + 150 MB |

## Pericomp 286

|               |              |              |
|---------------|--------------|--------------|
| MODEL:        | 286/10       | 286/12       |
| CPU:          | 286 @ 10 MHz | 286 @ 12 MHz |
| RAM:          | 2 MB         | 1 MB         |
| DISK STORAGE: | 1.2 + 40 MB  | 1.2 + 70 MB  |

## INTEL INBOARD 386/PC

Work faster & smarter: upgrade your 8088 based PC to a 386 based machine for a fraction of a price!

Single slot plug-in board with 16MHz 80386 CPU and 1 MB of 0 wait state RAM, 80387 socket, 5 year Intel warranty. Multitask your PC with the Intel Inboard/386 now!

## Zenith 14" Flat Technology Monitor

- Perfectly FLAT, reflection-free video tube
- "Flat tension mask" development breakthrough.
- Supports VGA & EGA, Hercules/MDA/CGA Modes.
- Resolution: 640 (H) x 480 (V) - Up to 95% less glare.

PHONE NOW FOR DEMONSTRATION AND PRICE

## NEC MULTISYNC II

The latest high resolution monitor from NEC: compatible with PS/2, VGA, EGA, PGA, CGA  
Automatically scans 15.5-35 kHz & 50-80 Hz  
Available now at Australia's lowest price!

## PC FAX \$990

Add-in board for your PC, the Complete Fax comes with memory resident software for background operation, send or receive faxes whilst using your computer, totally automatic sending and receiving, view faxes on screen or print them out.

## PC Answering Machine \$690

Add-in board for your PC, The Complete Answering Machine with the RAM-resident software will answer the phone and make outgoing calls even while your PC is doing other work, control it from PC or a remote phone.

## Olivetti M28 20MB mono

\$3290

## Zenith 286

\$call

## ALR Flexcache 386

\$call

## AST Premium 386

\$call

## AST Premium 286

\$call

## Wyse 386

\$call

## Wyse 286 8MHz 1MB mono

\$3590

## Toshiba T5100

\$call

## Toshiba T3200

\$call

## Everex Step 386

\$call

## Kaypro 286 40MB

\$2995



# DISCWARE

# (02) 212-6933

150 Broadway, Broadway, NSW 2007. FAX: 211-4065 TLX: AA23509

ALL PRICES INCLUDE SALES TAX. AVAILABILITY MAY BE LIMITED AT PRICES ADVERTISED. PRICES APPLY TO STOCK HELD AS AT 21/10/88

# Low Cost Software for your PC

Low cost software is now available for your IBM & compatible PC or your Commodore 64/128. Quality user supported and public domain software is available for \$12 a disk. No membership charges, no postage charges, no requirement to purchase more, just quality software at very low prices. Below we list just some of our great programs for the IBM PC. Call or write for your complete 16 page catalogue free of charge. No obligations, just the opportunity to save money.

## BUSINESS

**PC1009 PC DESK:** Good program that allows you to keep a file of names and addresses and easily merge them into your documents using the inbuilt word processor. Also provides handy access to a calendar, calculator and phone dialler.

**PC1022 TURBO SPELL:** Spelling checking program that includes its own large dictionary and allows you to add your own words easily.

**PC1037 READRITE:** Memory resident style analyser that allows you to determine the readability using the Flesch scale, of text on your screen as you type it.

**PC1080 THOUGHT ORGANISER:** Thor, a brain scanning program. Allows you to outline your thoughts and ideas on any topic and review them, edit them, scan them, and print them as you need. Great for students and business people.

**PC1220 ONBASE DATABASE:** Excellent memory resident "pop-up" database which allows you to have up to three databases resident on your computer at all times.

**PC1240 FILEMASTER:** Program designed to help you manage your paper files. Allows you to maintain them in serial order and look them up by subject, category, sender, receiver, or a number of other criteria.

**PC1400 LOTUS COMPATIBLE SPREADSHEET:** AsEasy, an excellent Lotus 123 compatible spreadsheet program with almost all the features of its famous counterpart, and a host of power features.

**PC1410 INSTACALC:** Powerful memory resident "pop-up" spreadsheet which can read Lotus files. Can import data directly from screen and export data directly into word processing documents.

**PC1623 PC BILL MASTER:** Cheque book management program which is very easy to use. Has a regular cheque book register type display and maintains recurring payments. Allows for easy bank statement balancing, and up to 100 ledger accounts.

**PC1681 SOLVE-IT:** Financial analysis program which calculates return on investment, break even analysis, depreciation schedules, loan schedules and even statistics. Computes 28 functions in all.

**PC1750 SPC INVENTORY:** Good inventory program which keeps track of sales, stock, and replacement cost. Can add sales tax, and handles up to three selling prices per item.

**PC1860 MANAGEMENT TUTOR:** Collection of programs that provide a complete computerised management course. Covers communication, delegation, decision making, interviewing, and planning.

**PC1962 EASY PROJECT:** Project management tool which allows upto 20 user defined project phases, unlimited number of resources per project, up to 1000 user defined tasks per project, fast data entry, automatic scheduling, and Gantt chart production.

**PC3101 OVERVIEW:** DOS shell file manager for hard disk users. Enables you to carry out routine file commands easily as well as providing a tree directory of your drive, multiple window access to up to six directories, file view function, and more.

**PC3230 CP/M TRANSFER:** Excellent CP/M to DOS transfer utility that also includes a CP/M emulator. Allows you to read Osborne, Kaypro, Morrow, and other CP/M formats, and even run the CP/M programs on your PC. **TWO DISK SET.**

**PC3270 SOFT-TOUCH:** Keyboard utility that allows you to program individual key combinations with user defined keystrokes or macros. Also allows you to combine three keystrokes into even larger macros.

**PC3400 LQ:** Memory resident printer utility that allows you to produce letter quality print on inexpensive dot matrix printers. Also lets you use different font sets on your printer with four fonts available at all times. Suitable for Epson, Star, Citoh, and IBM Proprinter.

**PC3450 CLASER:** Excellent utility for HP Laserjet users. Allows easy choice of printer fonts, printer port, graphic screen dumps, and even allows Laserjet to emulate an Epson FX printer.

**PC3500 P-BASIC:** BASICA compatible basic interpreter. Runs almost all Basic software. Suitable for Amstra PCs to replace non compatible BASIC-2.

**PC5030 OPTIKS:** Astounding graphics package which allows you to read and write almost any graphics format including MacPaint, PCPaintbrush, Newsroom, MS Paint, and more. Supports most printers including HP Laserjet, and even supports scanners. Most powerful graphics package we have seen. **TWO DISK SET.**

**PC5750 BARCODE GENERATOR:** Create barcodes with this program and your printer. Uses 3 of 9 system which allows for full alphanumeric coding. Configured for Epson and IBM Proprinter, but can be configured for other printers.

## RECREATION

**PC2030 3D CHESS:** Excellent graphics chess game suitable for both CGA and Hercules video. Multiple levels of play from beginner to champion. Allows analysis of play, help as you play, and a true three dimensional view of the screen.

**PC2042 DIAMOND BASEBALL:** Text simulation of the play by play action of a baseball game. You are presented with all the situations faced by a major league manager. So good it was used by a US radio station to simulate a game cancelled due to a strike.

**PC2060 AMERICAS CUP YACHT RACE:** Excellent graphics game which allows you to race the cup from your PC. Control the rudder and the sails as you tack and round the buoys with the best. This game has to be seen to be believed.

**PC2052 REFLEX POINT:** Graphics game where you have to save the Earth from Invids. In order to complete your mission you will use motor cycles that become body armour and jets that become robots.

**PC2054 NINJA:** Martial arts game which combines platforms with arcade action fighting. Requires CGA video card.

**PC2100 SLEUTH:** Adventure game where you have to find the murderer. Each time you play a new scenario is produced so you never get bored.

**PC2106 SPACE QUEST:** Adventure game with graphics where you are travelling through space and as you near your destination, trouble strikes.

**PC2110 BRAINSCAPE:** Excellent educational adventure game which teaches you neuroanatomy as you play. You find yourself alone in the brain fighting to find your way out. Interesting graphics.

**PC2202 BLACK JACK TUTOR:** Blackjack game which actually helps you improve your game. You play against the computer which helps you practice new tactics and strategy as you play.

**PC2300 WAR ON THE SEA:** High level strategic and tactical simulation of typical World War II naval campaigns.

**PC2353 MEGAGOPOLY:** Great investment strategy game. You inherit \$100,000 and must obtain financial independence. Test your investment skills whilst having fun.

**PC2800 ASTROTIT:** Adult arcade game. Destroy the falling objects before they destroy you. However you have to see them to believe them. Great fun for adults.

**PC2806 FRENCH:** Adult adventure game based in a French whorehouse. Find your way out but make sure you "look" at all the girls first.

**PC8005 ABC:** Good program for children to learn letters and numbers, and also develop their computer literacy.

**PC8020 CALCULUS TUTOR:** Good program for those ready to learn Calculus and advanced mathematics. Covers trigonometry, algebra, exponents and more.

## PRICES

5 1/4".....\$12 a disk

3 1/2".....\$18 a disk

**FREE POSTAGE & HANDLING**

## HOW TO ORDER

To order any of our software just write down the names and numbers of the programs you require along with your name, address and computer type, and mail it with payment by cheque, money order, or creditcard to

**FREEWARE**

**P.O. Box 496**

**Newtown NSW 2042**

or call us and use your creditcard on

**(02) 519-4233**

Fax (02) 516-4236

Credit cards accepted are Bankcard, Visa-card, and Mastercard. Please include your card number, type and expiry date.

**Commodore 64 Software  
also available**





**An unfortunate biological accident sends Captain Blood in search of his clones and a space-age craft takes on a realtime mission. Enter Chris Cain, as he battles his way through this month's games.**

## Blood's brothers

**Title:** Captain Blood  
**Computers:** Atari ST; Amiga  
**Supplier:** Atari  
**Format:** Disk  
**Price:** \$79.95

When Infogrames started advertising this game, most people, like myself, couldn't wait to see if the final product would live up to the claims printed under the pre-production screenshots. Sentences like '3-D animated creatures' and 'Music by Jean-Michel Jarre', coupled with the pictures, almost tempted you to place an order for the game even before it was finished. Well, now it is and the wait is over.

Captain Blood is a game of exploration and adventure. It also has one of the strangest plots I have ever encountered. A story involving computer programmers, Pac-men and Charles Darwin may sound interesting, but believe me, it really boggles the mind.

The outcome of this incredible saga, put simply, is that Captain Blood, while piloting a new biological starship, was accidentally cloned during a hyperspace jump. These clones were then scattered

across the galaxy. Unfortunately, this triggered a gradual cellular degeneration in the original Blood. His only hope of survival is to track down these dop-pelgängers and destroy them.

At the beginning of the game Blood's ship, the Ark, is placed at a random location in the universe, always just in sight of a populated planet. The screen displays the Ark's main control panel and the ship's birth tube. The birth tube is aptly named as this is where bio-consciousness, the ship's main computer, can create life forms called OORXXs.

The OORXX is a fish-like creature which is officially extinct. However, by sheer luck the Ark came across a living female OORXX and beamed it up. The computer then started to play with the creature's genes and eventually managed to 'grow' special OORXX missiles. When launched from the Ark these can be controlled like guided missiles. Bio-consciousness can then relate what they see and hear to Blood via the main comms screen.

Using this technique, Blood can set about exploring each of the planets (there are around 32,000) in an attempt to find the clones and recompile himself. As he is in no fit state to travel, the OORXX is a pretty handy gismo to have.

Controlling Blood's hand via the mouse, you can select various icons along the lower half of the display. These allow you to examine planets, launch an OORXX or plan your route among the stars. You can even blow away a planet, if you feel like it.

When an OORXX is launched, the screen changes to show it skimming across the surface of the planet. The trees, mountains and valleys of the world are all shown in vector graphics, giving a wonderful 3-D effect. The aim, once on the planet, is to locate a major life form. For some reason known only to the programmer of the game, all the beings in this universe live in vast trenches. Therefore, locating and following a trench will eventually lead you to one.

To chat and exchange information with an alien you must use the Upcom. This is an intergalactic interpreter, and using a clever icon communication system, the player can converse with any ALFs that appear. Icons depicting words are strung together to make sentences and then passed into the interpreter and on to your new-found friend. Any replies can be deciphered by running the mouse over the alien icons to reveal their meanings.



Here, Blood can find out about the clones. Some aliens will happily give you the co-ordinates of a likely clone, while others might want to be shipped to another planet or to have a little chore done for them before spilling the beans.

If they give their consent, aliens may be beamed aboard into a special chamber called the Fridgitorium. This is mainly used for transporting them between planets and for destroying clones. You can also disintegrate other beings, but that's not really of any use.

If you manage to wangle a set of co-ordinates from someone, setting them in the galaxy map allows you to hyperspace there. Pressing the Hyperspace

icon launches you into a very colourful experience. Wave after wave of colour shoots across the screen and the effect is quite impressive. The most impressive colour cycling, though, can be found when you destroy a planet. Waves of electricity spark around the display, similar to those old Flash Gordon thin-gies, giving a real 'movie' effect.

As Blood continues his search, he will become weaker. His state of health is reflected by the hand pointer and as he tires, so the limb is harder to control. However, I doubt that the flicker at the bottom of the arm, when in planet vision mode, is due to Blood's condition. It's more likely due to bad programming.

Captain Blood is presented well with digitised speech, detailed graphics and, as promised, title music by Jarre himself. The aliens are particularly well drawn and Blood's arm is also a highly detailed sprite. However, I'm not too sure about the durability of the game. It certainly has enough planets to visit and a variety of different alien races to converse with, but I found that it became very repetitive after a while. Maybe too much effort went into the graphics and not enough into the gameplay itself. It wouldn't be the first time and I doubt it will be the last. A pretty good game, but get some hands-on experience before you buy.

## Island hopping

**Title:** Carrier Command  
**Computers:** Atari ST; Amiga  
**Supplier:** Questor  
**Format:** Disk  
**Price:** \$69.95

Strategy games aren't usually my cup of tea, I admit. I would much rather take on a bunch of green-skinned, bug-eyed aliens in hand to hand combat than sit down and plan an attack route on a map. So, when I found myself playing a game of this ilk for hours on end, I knew it must be something special.

In the year 2166, volcanic activity in the Southern Ocean had caused many new islands to form. Scientists studying this phenomenon realised that by populating and building on the islands, they could tap into the volcanic energy which created them and put an end to the energy crisis which was threatening the world.

Two hi-tech aircraft carriers were commissioned to carry out this plan. These vessels would be capable of transporting vital equipment to each island, collecting raw materials and even acting as a defence force, if need be. The carriers

would start on opposite sides of the archipelago and work towards populating all the islands within a two-year period.

All was going smoothly until one of the chief engineers working on ACC Omega, the second carrier, was found dead in his office. Soon after this the Government received a ransom note from a cunning terrorist organisation. The terrorists had managed to re-program the control software of the Omega and threatened to instruct its computers to methodically occupy and destroy the islands unless their outrageous demands were met.

As the Government would not meet the demands, the Omega has now been set on its course. The only conceivable way to stop it is to engage it with the forces of its sister ship, the ACC Epsilon.

This is where *you* come in. As captain of the Epsilon, you must occupy as many islands as possible, building factories and defence plants on them. These would then attack the Omega as it tried to occupy them and it would be forced to defend itself, slowing it down. Furthermore, taking control of islands already captured by the Omega would more than likely result in it trying to recapture them.

To help you carry out this mission, the Epsilon has been fitted with all manner of modern technology. Manta attack aircraft can be launched from the front of the ship, and the rear houses a store of Amphibious Tanks, called Walruses. These vehicles can be equipped with various gadgets ranging from surface-to-surface missiles and chemical lasers to command centre pods and virus bombs.

The carrier also has a supply of defensive drones which, when activated, act as decoys for any missiles approaching it. The drones will travel with the craft when it is moving, but they slow it down considerably. Unless you take them inside between travels, it could take you six or seven minutes to reach the next island.

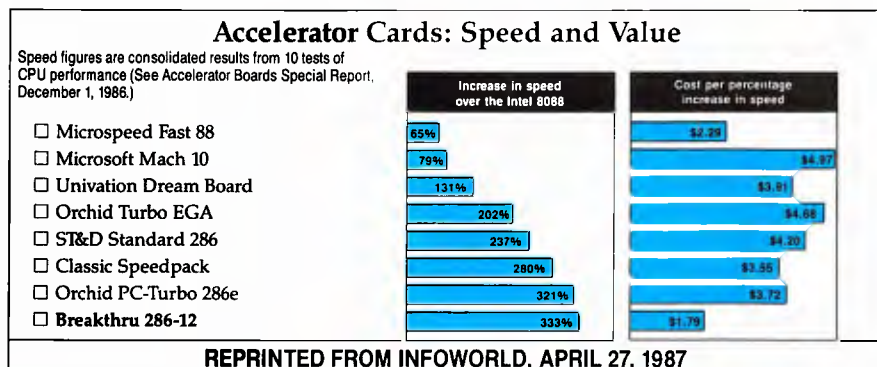
Launching an attack on an enemy island involves crucial timing and strategy. There are a few ways to do it, the easiest being to destroy the island command centre and then replace it with one of your own. There are three types of command centres available: defence, resource and factory. Each type has its own uses. Factory islands build Mantas, Walruses and missiles, whereas defence stations will attempt to fight off any invader.





# Think You Need an AT?

Make Your IBM PC Faster Than an AT in Just 5 Minutes!



We are excited about our three speedup products. You probably know about our Lightning disk access speedup software that was awarded PC Magazine's Best of 1986 award (see box). After the smashing success of Lightning, in late '86, we

guaranteed the Breakthru 286 board to be literally the most advanced, fastest, most feature-rich board available. The runaway success it has enjoyed truly proved that assertion. Now we go ourselves one better with the Breakthru 286-12. This new board has the clock speed cranked up from 8 to 12 MHz for speeds up to 10.2 times faster than an IBM PC. It is 50% faster than an 8MHz IBM AT, and up to a whopping 1,000% faster than a regular PC.

## HERE'S WHY THESE TWO BOARDS ARE SO SPECIAL.

First, they install so easily. A half-slot card means you don't even have to give up a full slot. What's more, unlike competing

products it works in the Compaq Portable and most clones. Easy diagrams show how you just place the card in an open slot, remove the original processor and connect a single cable. There is no software required. From that moment you are running faster than an AT.

Second, they are advanced. The BREAKTHRU 286 replaces the CPU of the PC or XT with an 80286 microprocessor that is faster than the one found in the AT. Has a 80287 math coprocessor slot for numeric intensive applications. A 16K cache memory provides zero-wait-access to the most recently used code and data. Speed switching software allows you to drop back to a lower speed on the fly for timing sensitive applications.

Third, you have full compatibility. All existing system RAM, hardware, and peripheral cards can be used without software modification. Our boards operate with LAN and mainframe communication products and conform to the Expanded Memory Specification (EMS). Software compatibility is virtually universal.

Faster and smarter than an AT - PCSG guarantees it.

Fourth, these are the best. There are several other boards on the speedup market. We at PCSG have compared them all, but there simply is no comparison. Many cards offer only a marginal speedup in spite of their claims and others are just poorly engineered.

We are really excited about these products. PCSG makes the unabashed statement that the BREAKTHRU 286 card represents more advanced technology than boards by Orchid, Quadram, P.C.

Technologies, Phoenix...we could go on. Breakthru 286 is undisputedly the turbo board with the biggest bang for the buck. And we include

FREE the acclaimed Lightning software. Call today with your credit card or COD instructions and we will ship your card the very next day.

But, no speedup board cuts disk access time in half

## LIGHTNING

software can - FREE w/Breakthru

"Lightning is almost mandatory..." - Steve Manes, PC Magazine Best of 86 review

Loads with the DOS - always ready as a background program to accelerate disk access. You do nothing - everything is automatic. Programs that frequently access the disk (hard or floppy) are made instantly up to 2 to 4 times faster. Uses a principle greatly enhanced from mainframe technology called caching. Fully exploits Above Board memory.

**LIGHTNING** is the standard against which all our competition measures itself because we achieve universal compatibility with other software. Data is never lost. Order **LIGHTNING** separately or get it free with your Breakthru 286 board.



# Think Again.

DON'T TAKE OUR WORD FOR IT. USE EITHER BREAKTHRU 286 SPEEDUP BOARD FOR 60 DAYS. IF YOU ARE NOT TOTALLY SATISFIED SIMPLY RETURN IT FOR A FULL REFUND.

Peripheral Systems



PERSONAL COMPUTER SUPPORT GROUP

Peripheral Systems, 4 Campbell St., Artarmon, NSW 2065 Ph (02) 437 6255





## AFTER DARK

As the Epsilon can only carry a limited amount of equipment at a time, resource networks have to be set up which allow transportation of materials to a designated stockpile island. When the carrier is within range of the stockpile, small drones can be sent out to collect vital supplies. It is imperative that you keep these channels open.

Supplies are ordered through a special screen which allows you to set priority ratings for each piece of equipment. My strategy for taking over islands, for example, requires the use of observation drones and surface-to-surface missiles. So, when ordering, I place these on high priority. If the carrier is ever hit by a missile, the repair screen allows you to fix any damage. This runs on a priority system too.

The player of Carrier Command is not limited just to controlling the Epsilon; they can also fly the Mantas and drive

the Tanks. Therefore, it is possible to equip a Manta with a communications beacon and then fly it ahead of the carrier. You can even make single-handed attempts at destroying enemy command centres, as long as the carrier is within signal range.

Possibly one of the most enticing features of Carrier Command is the way in which the world is set up. The whole game is played in real time. If you get a message saying that one of your islands is under attack and you can get there fast enough, you'll see the Omega in action. Everything happens independently of what you're doing.

The game also boasts some of the best solid 3-D graphics I have ever seen in a computer game. The speed at which things move is incredible, especially when you think of the calculations involved. It even has a completely icon-driven user interface. Every part of the

ship can be controlled via a set of detailed icons, making it very easy to handle.

Sound, though, doesn't seem to play a major role in the game. Apart from a few 'pings' and different engine noises there isn't much in the audio department. However, having said that, if you leave the title screen running for around 45 seconds you're treated to a sampled blast of the Carrier Command theme tune.

This only lasts about 10 seconds or so, but the full version is supplied on a cassette in the game pack. You even get a sticker!

All in all, Carrier Command is an excellent game. Everything about it is first class, from conception to execution. A shining example of why Rainbird is one of the top software publishing companies.

END

## FOR PEOPLE WHO NEED AFFORDABLE QUALITY

If you need top quality, high performance, compatability, TWO YEAR WARRANTY and FULL ON-SITE HONEYWELL BULL Service, but you insist on value for money, you should consider the new SYNCOMP range of personal computers:-

- *Mega 386i Tower 80386 20 MHz*
- *Mini 386i Desktop 80386 20 MHz*
- *Portable 386i Gas Plasma 80386 20 MHz*
- *Portable Ai Gas Plasma 80286 16 MHz*
- *Turbo Ai Desktop 80286 16 MHz*
- *Mini Ai Desktop 80286 12 MHz*
- *Micro Ai Slimline 80286 12 MHz*
- *Micro Xi Slimline 8088/V20 10 MHz*



# SYNCOMP

For your nearest Syncomp dealer

Phone: (02) 599 1000 Fax: (02) 599 1700

# CONFESSIONS OF A LUCID 3-D USER !

Tom Lawson of Perth, Western Australia writes:

Re: My Conversion to a True Believer

When I first loaded LUCID I asked myself:

"What can I do with 57K? I need lots of room!"

After two or three fiddles, and getting muddled up because of the differences between LUCID and Lotus commands I gave up, and decided to return it under the money-back guarantee. Besides, LUCID and SideKick + together gobbled up too much memory.

Well, I got busy, had to go overseas, and it sat for three months. So my money-back guarantee expired.

I think you have a marketing problem. You are selling this as a spreadsheet, against the basic mindset of the confirmed spreadsheet user, who wants more and more ROOM. As soon as my colleagues heard 57K they turned off.

What LUCID is is the damnedest, most useful tool on the market today. You get a spreadsheet free. This is how I found out:

While doing a bit of tidying up I ran across the LUCID box, and decided that I really needed a small memory resident spreadsheet to help in structuring a report that had been giving me trouble.

So I deleted SideKick + from my AUTOEXEC.BAT, replacing it with LUCID, and sat down to have another fiddle.

I remembered reading in the ad that I could attach a note to a cell. It actually worked. Then I discovered that I could import and export notes as files. It dawned on me that, instead of 9 notepads on screen with SideKick +, I could have about 500 with LUCID! So who needs SideKick - and LUCID can count!

I then started fiddling with Three-D. I found I could go down, create a spreadsheet to do some calculations, then go "down" again, but actually back to the original sheet, to create an input cell. So in the original sheet I can input to the subsidiary sheet, and get the calculated result in the next cell!

No diary, so I made one, using the date function. And then I made some Three-D holes to a sheet called BATS.LCD which has notes containing all my \*.BAT files!

I stuck in more holes to my bank account, cash account, credit cards, investments, then added a running Net Worth calculation. Then a hole to a sheet with note cells for current projects and report outlines. Then a macro to bring up my diary automatically.

I discovered that by sticking a 13 in curly brackets at the beginning of each filled cell in my address list I can dump an entry into a document as a finished address!

Then I stumbled across CALENDAR.LCD and CALENDAR.MAC. It does have a diary, and a beauty! I moved all my stuff into spare cells on my current diary, then made holes through to future months. I've got the lot! And all on one screen! I rarely use another spreadsheet or WP. My biggest single spreadsheet? About 24K.

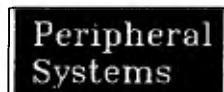
In the end I was so impressed I read the manual.

I understand an upgrade is coming but as it stands right now, LUCID IS GREAT. Please keep me on your list, not just for upgrades, but for anything else these guys come up with.

I have never been so pleased in my life to have missed a deadline.

**THIS IS AN UNSOLICITED LETTER FROM A GENUINE LUCID 3-D USER.**

## LUCID 3-D AVAILABLE FROM



Unit 9, 4 Campbell Street,  
Artarmon N.S.W. 2064  
PHONE: (02) 437 6255  
FAX: (02) 439 1773

OR

WA (09) 481 1565

SA (08) 42 5681

QLD (07) 812 1611

\* SideKick + and Lotus are Registered TradeMarks of their respective owners.

# HERE TODAY. HERE TOMORROW. THAT'S BLUE CHIP.

LOTUS 123  
\$579

MICROSOFT MOUSE  
\$215

MICROSOFT WORD  
(+ FREE PAGEVIEW)  
\$595

MICRON MEMORY CARDS  
512K 2MB 4MB  
\$850 \$1900 \$3860

EPSON LQ 500  
\$690



QUATTRO  
\$289

SPRINT  
\$289

EPSON LX800 — \$445

OMT MULTISCAN  
\$690

OKI MICROLINE  
80 COLUMN PRINTER  
\$395

## BLUE CHIP COMPACT TURBO PC/XT

640K Ram, Microsoft Dos 3.3, GW Basic, 1 x 360KB FD, Ser/Par/Games Ports, 101 Keyboard, 4.77/10Mhz Processor, Mono Graphic Card, Green or Amber Monochrome Monitor. 10 FREE DISKETTES.

**\$1,395.00**

## BLUE CHIP TOWER

1MB RAM, Microsoft Dos 3.3, G.W Basic, 1 x 1.2MB FD, 1 x 720KD FD, 42MB HD, 101 Style Keyboard, Ser/Par/Clock Ports, Monochrome Monitor.

**\$5,995.00**

## BLUE CHIP AT

Microsoft Dos 3.3 + G.W Basic, 640K Ram, Ser/Par Ports, 101 Keyboard, 1.2MB FD, 10Mhz Processor, Zero Wait State, Mono Graphic Card, Green or Amber Monochrome Monitor. 10 FREE DISKETTES.

**\$1,995.00**

## OTHER BLUE CHIP PC/XT CONFIGURATIONS

|                                                      |            |
|------------------------------------------------------|------------|
| Blue Chip XT 2 x 360KB FD, Dos Mono.                 | \$1495.00  |
| Blue Chip XT 1 x 360KB FD, 1 x 20MB HD Dos Mono.     | \$1,995.00 |
| Blue Chip XT 1 x 360KB FD, 1 x 20MB HD Dos Color.    | \$2,395.00 |
| Blue Chip XT 1 x 360KB FD, 1 x 20MB HD Dos EGA.      | \$2,795.00 |
| Blue Chip XT 1 x 360KB FD, 1 x 20MB HD Dos Multiscan | \$3,195.00 |

## OTHER BLUE CHIP PC/AT CONFIGURATIONS

|                                                  |            |
|--------------------------------------------------|------------|
| Blue Chip AT 1 x 1.2MB FD, 1 x 20MB HD Mono      | \$2,395.00 |
| Blue Chip AT 1 x 1.2MB FD, 1 x 20MB HD Color     | \$2,795.00 |
| Blue Chip AT 1 x 1.2MB FD, 1 x 20MB HD EGA       | \$3,195.00 |
| Blue Chip AT 1 x 1.2MB FD, 1 x 20MB HD Multiscan | \$3,595.00 |

## EXCLUSIVE TO BLUE CHIP.

|                                                        |                                                                 |                                                                                  |
|--------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------------------------------|
| <b>HITACHI HL300</b><br>2 x 720K Drives<br>LCD Screen. | <b>HITACHI HL320</b><br>2 x 720K Drives,<br>Backlit LCD Screen. | <b>HITACHI HL320H</b><br>1 x 720K Drives,<br>1 x 20MB HD,<br>Backlit LCD Screen. |
| <b>\$1,695.00</b>                                      | <b>\$1,895.00</b>                                               | <b>\$2,995.00</b>                                                                |

## PSION ORGANISER II READY TO GO PACK

Organiser II with up to 320K RAM, 32K data pack, AC adaptor, Comms Link (PC, Printer, Modem interface) **\$995.00**

## MICROSOFT.

|                      |       |
|----------------------|-------|
| WORD (+ PAGEVIEW)    | \$595 |
| PAGEVIEW             | \$ 75 |
| MICROSOFT MOUSE      | \$215 |
| EXCEL                | \$750 |
| WORKS                | \$295 |
| WINDOWS              | \$150 |
| WINDOWS MOUSE        | \$300 |
| QUICK BASIC COMPILER | \$115 |
| QUICK C COMPILER     | \$115 |
| CHART                | \$425 |
| <b>UTILITIES.</b>    |       |
| TURBO PASCAL         | \$135 |
| TURBO C              | \$135 |
| TURBO PROLOG         | \$135 |
| FASTBACK PLUS        | \$285 |
| NORTON ADVANTAGE     | \$210 |
| NORTON UTILITIES     | \$135 |
| NORTON COMMANDER     | \$119 |
| NORTON EDITOR        | \$119 |
| XTREE PRO            | \$205 |
| CARBON COPY PLUS     | \$325 |

## GENERAL.

|                   |       |
|-------------------|-------|
| LOTUS             | \$579 |
| QUATTRO           | \$289 |
| SPRINT            | \$289 |
| PARADOX           | \$975 |
| DBASE III PLUS    | \$825 |
| CLIPPER SUMMER 87 | \$889 |
| Q & A             | \$525 |
| WORDPERFECT V4.2  | \$550 |
| WORDPERFECT V5.0  | \$650 |
| FIRST CHOICE      | \$215 |
| MULTIMATE ADV II  | \$725 |
| WORDSTAR 2000+ V3 | \$495 |
| WORDSTAR PRO V4   | \$495 |
| FRAMEWORK II      | \$955 |
| ABILITY PLUS      | \$395 |

**BLUE CHIP NOW  
GOVT. PREFERRED  
PE30 CONTRACTOR**

## MODEMS.

|                           |       |
|---------------------------|-------|
| INTERLINK M3+12/75        | \$195 |
| INTERLINK IQ123           | \$445 |
| INTERLINK IQ1234          | \$695 |
| NETCOMM POCKET            | \$445 |
| NETCOMM 123 INMODEM       | \$455 |
| NETCOMM 1234 IN MODEM     | \$559 |
| NETCOMM AUTOMODEM 123     | \$450 |
| NETCOMM AUTOMODEM 1234    | \$555 |
| NETCOMM SMARTMODEM 123SA  | \$595 |
| NETCOMM SMARTMODEM 1234SA | \$775 |

## PRINTERS.

|                    |        |
|--------------------|--------|
| OKI MICROLINE 182  | \$395  |
| OKI MICROLINE 183  | \$595  |
| OKI LASER PRINTER  | \$3495 |
| EPSON LX800        | \$445  |
| EPSON LQ500        | \$750  |
| EPSON GQ3500 LASER | \$2995 |
| BROTHER 1109       | \$395  |
| BROTHER 1709       | \$895  |
| BROTHER HL8LASER   | \$4500 |

8 RAILWAY PL. RINGWOOD. TEL: 870 2243. 109 DRUMMOND ST. CARLTON. TEL: 663 7764.  
350 SOUTH RD. MOORABBIN. TEL: 553 4488. 44 MOUNTAIN ST., BROADWAY.  
TEL: 281 1044. 463A CHURCH ST. PARRAMATTA. TEL: 683 1599. 272 PACIFIC HWY.  
CROWS NEST. TEL: 436 3655. UNIT 4, 315 KELVIN GROVE RD, KELVIN GROVE. BRISBANE.  
TEL: 356 7722. 237 PULTENEY ST. ADELAIDE. TEL: 232 2555. CNR. CROWN ST. & RAILWAY  
PDE. WOLLONGONG. TEL: 26 3200. 30 LYELL ST. FYSHWICK CANBERRA. TEL: 80 7833.  
2ND FL. 160 ST. GEORGE'S TCE. PERTH. TEL: 481 6427.

**BLUE  
CHIP**  
Electronics P/L



## LAZING AROUND

*Brainteasers courtesy of JJ Clessa.*

### Quickie

The girl said to the man: "Will you marry me?" The man replied: "Yes, but I won't be your husband." Assuming the man was telling the truth, how was this possible?

### Prize puzzle

As I dug deep into my bag of brain-teasers, I found this gem which was written a couple of years ago.

A certain number of one cent coins is converted to an exact number of US silver dollars at 58c for each dollar.

The number of dollars obtained hap-

pens to be a perfect square, whereas the original number of cents was one less than a perfect square.

What was the smallest total number of coins (that is, cents plus dollars) that there could have been at the outset?

Address your answers on postcards (or backs of sealed envelopes) to: Lazing Around November, APC, 124 Castlereagh Street, Sydney 2000, to arrive no later than November 30, 1988.

### August prize puzzle

A fairly good response. It turned out that there were two possible solutions, one of which we had not anticipated. We ac-

cepted either for the prize draw.

The winning entry came from Mr I Reeves of South Yarra, who receives our congratulations immediately and his prize shortly.

Mr Reeves' answer coincided with ours: cheque received, \$11.37, \$3 spent on booze. The alternative answer was: cheque received, 25 cents, \$20 spent on booze.

We're still receiving attempts at the four 7's problem. No genuine solution has been received, but for a good effort how about:  $7+7+7+\sqrt{\quad} = 26$  where the fourth 7 becomes a Roman five?

END

## USER GROUPS

*Below is a list of updates and additions to our full User Group listing which is available to readers on request. Please send a SSA envelope to 'User Groups', APC, 124 Castlereagh Street, Sydney 2000.*

### Vic

**Central Victoria Computer Club** meets on the first Friday of each month at 21 Carpenter Street, Quarry Hill, commencing at 7.30pm. Various computers are featured each month, and a book library and monthly newsletter are available.

For further information contact the Publicity Officer, Jim Shelton, tel: (054) 46 8060.

### Qld

**Southside Amstrad Group of Brisbane** meets on the third Saturday of each month

at the Loganlea High School, commencing at 2.00pm. All aspects of computing with the CPC, PCW and all PC computers are catered for. A monthly newsletter and use of a public domain library is available to members. Activities include demonstrations, instructions, discussions and information exchange.

For further information contact the Secretary, John Bothwright, 47 Ewing Road, Woodridge. Tel: (07) 209 4969.

### SA

**Eyre Peninsula Computer Users** meet irregularly in homes or at workshops. The

group is formed mainly of farmers and small businessmen and the main line of computers is IBM and compatibles.

For further information contact the Secretary/Treasurer, Vicki Foster, PO Box 270, Wudinna 5625.

### Tas

**Hobart User Group** meets twice a month. The group focus on IBM and compatibles and the Tandy range of machines. For further information contact the Secretary, John Manley, PO Box 420, Moonah 7009.

END



**INFORVISION  
AUSTRALIA**

LEVEL 1, SUITE 4  
40 YEO ST. NEUTRAL BAY  
TEL: (02)908 1777  
FAX: (02)908 1662

## Would you like to learn more about interactivity?

There is only one Australian company recognised internationally as having viable solutions to PC Interactivity for corporate, point of sale and training applications - InforVision Australia.

Call David Goold or Graham Carruthers today on (02)908 1777 for full details.

- \* IMAGE DIGITISING \* COMPUTER BASED TRAINING \* ELECTRONIC PUBLISHING \* VIDEOFINDER (interactive text & image database)
- \* COMPUTER HARDWARE (Goldstar, Western, Eizo, Hauppauge & specialty interface cards) \* INOVION PERSONAL GRAPHICS SYSTEM III

*"Leaders in Information Technology Services"*

### Mike Mudge investigates prime number density among simple polynomials.

This article concentrates upon only two questions from what is readily seen to be an immense area for conducting empirical research in number theory. Interested readers are encouraged from the outset to consider more general circumstances when writing programs and analysing their output.

**Question 1** When is a quadratic polynomial with integer coefficients prime?

We consider the quadratic polynomial  $f(x) = ax^2 + bx + c$ ; where  $a$ ,  $b$  and  $c$  are given integers and  $x$  takes integer values from 0 to  $N$ .  $V(f(x), N)$  is defined to be the number of  $x$ -values for which the modulus of  $f(x)$  is either prime or unity.

**Test Case.** For the Euler Polynomial  $f(x) = x^2 + x + 41$  it is found that  $V(f(x), 1000) = 581$ .

E. Karst, in 'New quadratic forms with high density of primes' 'Elem d Math', vol 28 1973, pp 116-118, found a polynomial  $g(x) = ax^2 + c$  for which  $V(g(x), 1000) = 598$ .

What is it? Can  $V(f(x), 1000)$  be greater than 598 for quadratic  $f(x)$ ?

**Question 2** For how long can a polynomial of the form  $x^n + b$  remain composite (non-prime) where  $n$  and  $b$  are given positive integers and  $x$  takes the values 1, 2, 3, 4 ...?

Consider the polynomial  $x^6 + 1091$ ; this is composite for  $x = 1, \dots, 3905$ , (Shanks, 1971).

However, there exists a value for  $b$  such that  $x^6 + b$  is composite for  $x = 1, \dots, 7979$ . What is it?

Consider the polynomial  $x^{12} + 4094$ ; this is composite for  $x = 1, 2, \dots, 170624$ ; however, there exists a value for  $b$  such that  $x^{12} + b$  is composite for

$= 1, 2, \dots, 616979$ . What is it? See for example KS McCurley, 'The Smallest Prime Value of  $x^n + a$ ', Canadian J Math, vol 38, 1986, pp925-936, also 'Polynomials with no small prime values', Proc Amer Math Soc, vol 97, 1986, pp393-395.

Readers are encouraged to construct programs to evaluate firstly  $V(ax^2 + bx + c, M)$  for given  $a$ ,  $b$ ,  $c$  and  $M$ , and secondly the length of the initial composite value interval for  $x^n + b$  given  $n$  and  $b$ .

Test data for both programs and suggested targets for an initial search are to be found in the above text.

Readers are further invited to send their attempts at these problems to Mike Mudge, c/- APC, 124 Castlereagh Street, Sydney 2000, to arrive by 18 November, 1988. It would be appreciated if such submissions contained a brief description of the programs and a summary of the results obtained in a form suitable for publication in APC.

These submissions will be judged using subjective criteria, and a prize will be awarded by APC to the 'best' contribution received by the closing date.

Please note that submissions can only be returned if a suitable stamped addressed envelope is provided.

### Review: May

The subject of cryptology attracted a remarkable response. Many submissions were quite sophisticated and all concerned are to be congratulated upon the interest which they have shown in

this topic. It is hoped to produce a related Numbers article in the near future; meanwhile, here is a selection of interesting points.

Firstly those readers who wish to study codes and cyphers in depth should consider contacting The American Cryptogram Association (ACA) at 12317 Dalewood Drive, Wheaton, Maryland 20902, USA. The Association has members in Australia.

An interesting program in Turbo Basic has been supplied by M Barge, whilst the following readers' challenge is due to T Boyd:

A3 123 B4 135 93 13D BF 13F 81 121 5A 11E 12D 91 B0 9A C0 129 89 67 F9 92 2A F4 E1 11D BC 108 7F 107 69 147 117 66 65 7D E5 108 116 92 9E B7 11A D6 AE 92

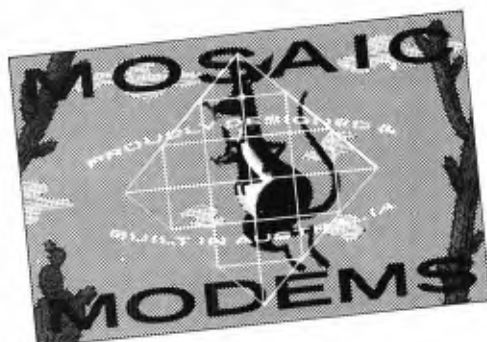
It was generated on an Acorn BBC B in Basic II — 'it may matter'.

This month's very worthy prizewinner is Mr Anthony Quas, whose program was written initially in APL 68000 on a SAGE and then transferred to APL\*PLUS/PC on a PC, and finally into I-APL/PC.

A significant contribution to this work is the extension of the scope of the exponentiation cypher to deal with products of distinct primes.

END

**Mike Mudge welcomes correspondence on any subject within the areas of number theory and other computational mathematics. Particularly welcome are suggestions, either general or specific, for future Numbers articles; all letters will be answered in due course.**



**A unique Australian modem ideal for reliable operation in unattended remote locations.**

- All parameters saved in nvram
- All data protocols accommodated
- Always disconnects
- Resets after power loss

## MOSAIC 2400 BXONE

MOSAIC DESIGN AND PRODUCE  
INDIVIDUAL MODEMS TO CUSTOMER  
SPECIFICATIONS CALL  
RICHARD OR ELSE TODAY!

**M O S A I C**  
**ELECTRONICS**

PHONE (07) 279 1777 FAX (07) 279 1272 P.O. BOX 251 KENMORE Q4069

# Graphics' a Breeze!

## A New Dimension at Your Fingertips.

### Genius Dyna Mouse

#### High Performance And Dynamic Resolution 300-1000 DPI

An Exciting new concept in mouse control has been developed. Genius Dyna Mouse 300-1000 DPI resolution gives greater ease and speed in selecting a precise location on the screen.

The faster the mouse's movement, the greater distance the cursor moves. Therefore, less hand held movement with precision control is involved.

#### Genius Menu Maker Software

Genius Dyna Mouse comes with the Genius Menu Maker allowing you to design or modify Pop-up Menus for any of your applications. It also provides 20 pre-configured menus for dBase III, SuperCalc3, Turbo Pascal, MS DOS, Lotus 1-2-3, and others.

#### Dr. Halo III

- \* Dr. Halo III lets you create stunning graphics which can be merged to show a slide presentation.
- \* Cut copy, and store any size picture.
- \* For CGA, EGA, Hercules, PGA, and VGA displays.

| Product        | GM-6000                   | GM-S2     | GM-U2                     |
|----------------|---------------------------|-----------|---------------------------|
| Function       | Genius Microsoft PC Mouse | IBM PS/2  | Genius Microsoft IBM PS/2 |
| Interface      | RS-232                    | PS/2 Port | PS/2 Port                 |
| Resolution DPI | 300-1000                  | 300-1000  | 300-1000                  |
| Button         | 3                         | 2         | 2                         |
| Menu Maker     | Yes                       | Yes       | Yes                       |
| Menu library   | Yes                       | Yes       | Yes                       |
| Dr. Halo III   | Yes                       | Yes       | Yes                       |
| Mouse Pad      | Yes                       | Yes       | Yes                       |
| Mouse Pocket   | Yes                       | Yes       | Yes                       |

### GeniScan™ GS-2000

#### Just Take a Scan !!

#### That's What The GeniScan Can Do and More.....

The easy-to-handle GS-2000 Handy Scanner featuring 105 mm Scanning Width and 200 D.P.I. Resolution enables you to reproduce graphics and text on your computer screen. Images can be scanned at 256, 512, or 840 dots per line.

With accompanying powerful software - ScanEdit and Dr. HALO III, scanned images can be condensed to a small-size portrait and placed at any location on the screen. Sixteen variations of shading allow you to process the image to achieve the desired look you want.

Multi-Window Scanning offers you the opportunity to open multiple windows on screen and scan images into these windows. Also, Transparent Overlapping enables you to place one image on top of another to create clear, precise new images without any image degradation.

The images created can be transferred to O.C.R. (Optical Character Recognition) or other software utility such as DR. HALO III, PC Paint Brush, Ventura Publishing, Page Maker etc.,

### Genius Tablet GT-1212

#### Maximum Performance at Minimum Cost

With versatile functions and compact design, you assuredly will find GT-1212 to be your optimal choice. The operating mode of GT-1212 is compatible with Summagraphics MM 1201 Serial Mode, and Mouse Modes - Microsoft and PC Mouse. You can utilize not only a variety of today's top CAD software like Auto CAD, Versa CAD, Generic CAD, Turbo CAD, Fast CAD, Microsoft Window, and Dr.HALO III, but also any other utility software such as dBase III, Lotus 123, Microsoft Word, Page Maker, Ventura Publisher, Symphony, and Framework.

Moreover, the Window Cover-Sheet allows you to insert any utility template or drawing sheet; and the Genius software enables you to customize your own symbol menu library.

Its extreme accuracy is attributed to High Resolution - up to 1000 lines per inch on 12" x 12" Digitizing Area. You can draw the exact graphics that you want by tracing an existing picture or making a free-hand drawing.

The Genius Tablet GT-1212 package includes Genius Tablet with Puck, Auto CAD Template & Menu File, Genius Menu Maker & Menu Library, and DR. HALO III software.



All above mentioned names of products and softwares are registered trademarks of their owners.



**KUN YING ENTERPRISE CO., LTD.**

11F, NO. 116, SEC. 2, NANKING E. ROAD., TAIPEI, TAIWAN, R.O.C.

TEL: (02)565-2817 TELEX: 11388 KUNYING TELEFAX: (02)511-0873



### Conferences/Meetings

#### November

**11 Seminar on International Telecommunications** An all-day seminar will be held at the Toronga Centre, Toronga Park. The event is being co-hosted by ATUG and INTUG. *Enquiries, Marguerite Rona, tel: (02) 957 1333*

**14 Practical Management of CAD Drafting Systems** This seminar will concentrate on the day-to-day running of a CAD system and will provide practical suggestions and new ideas for the successful implementation of a CAD system. *Enquiries, ACADS, tel: (03) 519 153*

**15-18 AI '88 Conference** Formerly the Australian Joint Artificial Intelligence Conference, AI '88 is presented by the National Committee for Artificial Intelligence and Expert Systems. *Enquiries, Tracey Young, tel: (08) 228 5586*

**17-18 Second Australasian MSC Users Conference** Sponsored by Compumod, this conference on finite element analysis will be held in Sydney and is designed to benefit engineers, designers and analysts both familiar and unfamiliar with FEA. *Enquiries, Compumod, tel: (02) 232 1677*

**21 NetWare User Group** The new NetWare User Group will hold its inaugural meeting in Brisbane on Monday November 21 at 5.45pm. This group encourages your support and provides an open forum for all NetWare users. *Enquiries, Alan Scott, tel: (07) 221 9122*

**21-23 Advanced User Interface Workshop and Seminar** This seminar is aimed at software engineers and developers, and users of interactive information processing systems. Participants will be given hands-on experience with various current systems. *Enquiries, tel: (03) 344 5230*

**30 United Unisys User Group** U-Cubed, the United Unisys User Group will hold its Spring Conference in Melbourne at the Regent Hotel. *Enquiries, Kevin Pilkington, tel: (03) 628 2642*

**30 Data General AOS/VS Colloquium** This three-day event will be held at the Regent Hotel in Melbourne and presents an opportunity to meet the developers of Data General's operating system. *Enquiries, Tim McQueen, tel: (03) 698 6988*

#### Training

#### November

**10 Graphic Arts for Publishing** This course is a good overview discussing a range of the packages available and those best suited to certain applications. *Enquiries, Dimension Graphics, tel: (02) 929 5855*

**10 Computers for the Beginner** This beginners course covers all the basics such as jargon, types of computers and applications. Your fees will aid Compuskill with their computer training program for the unemployed. *Enquiries, Compuskill, tel: (03) 314 1155*

**10-11 How to Write Effective User Documentation** The computer industry takes its hat off to those with the ability to write and produce user friendly online and manual documentation. Take this opportunity to increase your popularity. *Enquiries, DP Education, tel: (02) 319 1988*

**14 WordPerfect Conversion 4.2 to 5.0** Update the easy way. Reference manuals are hardly thrilling night time reading so MTE offers you the hands-on alternative to learning the latest features of WordPerfect 5.0. *Enquiries, MTE, tel: (02) 261 5555*

**14-15 Small Team Leadership Seminar** Team leading calls for two basic skills — people management and task management. Managing other people demands first that one can manage oneself. *Enquiries, DP Education, tel: (02) 319 1988*

**14-15 Tax Effective Business Strategies** This two-day seminar is a must for all levels of management. Come to terms with capital gains tax, imputation, foreign and external investment, tax structures and financial techniques. *Enquiries, MTE, tel: (03) 670 7117*

**14-18 Computer Operations — Supervision and Control** The course will show delegates how to apply a comprehensive range of concepts and techniques necessary to effectively manage resources and supervise staff in an operations environment. *Enquiries, BIS Applied Systems, tel: (02) 922 1899*

**15-18 Project Management Workshop** Namara-Numerix will hold a four-day, hands-on, project management workshop integrating traditional management and control methods with contemporary PC software. *Enquiries, Wendie Bailey, tel: (02) 963 2301*

**17-18 Getting Started With Expert Systems** Organised by Spectrum Information Services, this seminar provides hands-on experience in developing a prototype expert system of your choice. Advice on tool and hardware selection will also feature. *Enquiries, Spectrum, tel: (02) 683 3838*

**21-22 Critical Skills for Secretaries and Assistants** As an executive secretary/personal assistant, you hold a very demanding position as a key person in assuring managerial effectiveness. Broaden and polish your skills to expand your work horizons. *Enquiries, MTE, tel: (03) 670 7117*

**21-22 Introduction to Multimate** AMIC is offering both advanced and introductory courses in Multimate at its Melbourne training centre. *Enquiries, AMIC, tel: (03) 663 6080*

#### Exhibitions

#### November

**21-23 AutoCAD Expo '88** AutoCAD users, prospective users, CAD experts and enthusiasts, consultants, applications developers, trainers and students will all gather to see and hear the latest from the AutoCAD arena. *Enquiries, Autodesk, tel: (03) 429 9888*



## *Soft Centre's suite solutions*

---

**Soft Centre** can  
help you solve your connectivity problems,  
because we're distributors of the leaders in connectivity.  
Call us first. We'll help you put it together!  
Dealer applications invited.



Very simply...the world's best serial port expansion cards. The only ones  
certified by all the leading operating system manufacturers:  
SCO Xenix, PICK Systems, BOS Software, PC - MOS, and MUMPS.  
Arnet, the standard others try to copy, backed by a unique lifetime warranty.  
Multi: 4 (upgradeable), 8  
Smartport (intelligent): 4, 8  
Modular Multiport RJ - 11 (Telco): 8  
IBM PS/2: 4, 8

Tested against AST, Digiboard and others, *US Infoworld* rates Arnet  
well above all competitors. Don't buy second best, use Arnet!

### **Novell**

SMC Arcnet - the LAN Protocol  
under Netware that *PC* magazine  
chose over all others as giving  
least degradation with best price  
and performance. Available  
for PS/2.

### **BOS 2000**

Yes BOS/LAN multi-user  
systems provide the only  
network that incorporates  
multiple file servers and  
dumb terminals.

### **Computers, Terminals and Printers**

The final part of the equation.  
Best selling NEC computers,  
top line Opus displays, high  
performance Seikosha printers  
and stunning Ricoh  
laser printers.

### **Soft Centre Pty Ltd**

Melbourne (Head Office) - 40 Jolimont Terrace, East Melbourne 3002 Phone; (03) 654 1977, Fax; (03) 650 3429  
Sydney - 30 George Street, Redfern 2016 Phone; (02) 699 9344, Fax; (02) 698 7205  
Perth - 22 Charles Street, South Perth 6151 Phone; (09) 474 1124 Fax; (09) 367 8963

# Australian Personal Computer MARKETPLACE

RIBBON RECYCLING

TRAINING

## 3 DAY COURSES FOR THE PRICE OF 2

**A TOTAL SOLUTION FOR YOUR TRAINING REQUIREMENTS  
INTRODUCTORY AND ADVANCED COURSES**

Spreadsheets • Word Processing • Desktop Publishing • Databases •  
Operating Systems • Accounting Packages

1 computer per student • 30 day "hotline support" • Max 6 students per classroom  
2 minutes from City (City pick up) • Course notes • Lunch provided • Certificate upon  
completion



**CONSULTING AND TRAINING SERVICES**

**SYDNEY (02) 660 6077 MELBOURNE (03) 629 4111**

## CUT YOUR PRINTING OPERATING COSTS IN HALF "INKSTAR"

The Necessary Office Product



Re-Inks all dried out FABRIC  
Ribbon Cartridges

**WE GIVE YOU THE CHOICE.  
USE OUR SERVICE OR PURCHASE  
YOUR OWN.**

Phone us on (03) 241 4044 for your  
no-obligation demonstration.

## — RIBBON RELOADING —

We reload all types of spools/cartridges with  
quality new inked ribbon, sonically welded.

Prices average 1/2 to 2/3 new ribbon price  
plus a modest post/packaging charge.

We also deal in single colour, multicoloured and  
textile printing ribbons, including new ones.

*PS: If you insist, we can also  
reink your ribbons!*

**Lazarus Ribbons**

70 Walseley Rd  
Mosman  
NSW 2088

tel: (02) 960 2737  
fax: (02) 262 3407



## DON'T THROW THAT RIBBON AWAY IT CAN BE MADE AS GOOD AS NEW - OR BETTER - FOR HALF THE COST OF A NEW ONE -

Most ribbons can now be Re-Inked so well  
that they are better and last longer than the  
original. In many cases the ribbon is  
thrown out because it becomes jammed.  
This can also be repaired most of the time.

If we say we can do it, we will GUARAN-  
TEE to Re-Ink at Half the normal selling  
price or less. You give us your ribbons in  
any state. We return them Re-Inked, and/or  
Repaired in a sealed plastic envelope. The  
ribbon is numbered and labelled with the  
date of the Re-Inking. We track the life of  
every ribbon. How many times it jammed,  
how often it has been Re-Inked, what your  
cost saving has been over any period.  
When it finally cannot be used, we will try  
to supply a new one at less than you  
would normally pay.

**SO WHAT HAVE YOU GOT TO  
LOSE? CALL US NOW**



**THE RIBBON  
RE-INKING  
COMPANY**

(A Division of PUTRIM Pty Ltd)

156-158 Dougherty Rd, West Heidelberg, 3081

**Tel: (03) 459 9055**

A minimum of 10 ribbons in any one delivery. Over  
50, pick and delivery in Melbourne metro free,  
country, interstate cost.

## MARKETPLACE

Marketplace is a customer service directory, covering the complete range of computer products and related services, which will enable you to advertise at a more cost effective rate without compromising your advertising needs.

**TO BOOK YOUR MARKETPLACE ADVERTISEMENT  
CALL CRAIG DAVIS ON (03) 531 8411**



# Australian Personal Computer

# MARKETPLACE

## DMI HARD DISK REPAIR SPECIALISTS

### DMIAUSTRALIA NEW ZEALAND

Protect your investment. DMI has a class 100 clean room, with repair facilities designed to support your hard disk.

- Major Types Supported:
- Miniscribe
- Seagate
- Tandon
- Rodime
- CMI
- Call for others



Call or fax us for a quote on repair of your drive.

### DISK MEDIA INTERNATIONAL PTY LTD

Unit 9, 189-191 Cheltenham Rd,  
Keysborough, Victoria  
Telephone: (03) 706 3444  
Fax: (03) 706 3446

**EXCLUSIVE MINISCRIBE IN-WARRANTY  
REPAIR CENTRE**

## PC GOT THE BLUES ?



CALL

## KCM COMPUTERS

**(03) 429-2733**

FOR FAST SERVICE

### KCM Computers Pty. Ltd.

380 Victoria Street, Richmond, Victoria 3121  
Tel (03) 429 2733 Fax (03) 429 4732 Telex AA39765

## Teach Yourself Computers

**Video & Disk Based Training  
Programs.  
Effective & Guaranteed to save  
you money.  
Over 40 Self-Teaching courses  
available including:**

Lotus, Excel (New), Symphony,  
Open Access II, Ventura, Page-  
Maker, WordPerfect, Displaywrite,  
Multimate, MSWord, dBase III +,  
Paradox, RBase, Unix & C, LAN  
Admin, DOS, SQL, Typing  
Computer Literacy & many more.

**RENT OR BUY  
Ring Now for Free  
Catalogue**

### MICRO MANAGEMENT SERVICES

15 Woolrych Cres, Davidson NSW 2085  
Fax: (02) 452 5098 Ph: (02) 452 5966



Do you have a problem with  
your PC software?  
Can you understand the messages  
in the manual?

Do you need help installing NEW software?

**I can solve MOST problems  
OVER THE PHONE!**

Installation, configuring & advisory service.

P.O. Box 280, Rosanna 3084  
Victoria, Australia

(03) 459 9749 - Intl + 61 3 459 9749

## PC-LABELS

**The Smart Name & Address, Letter  
& List Printing Program. A Must For  
Wordstar Mailmerge Users.**

- Prints 17 styles of labels
  - Single & Multi user
  - Unlimited user codes
  - Prints telephone lists
  - Prints name lists
  - Prints address lists
  - Prints mailmerge files
  - Conference & tour labels
  - Sales prospect lists
- Post cheque for **\$199.00**.  
Large Dealer Discounts  
**PO Box 828 CASTLE HILL**  
**(02) 680 4808**

## ≡ F2 FREEWAY ≡

□ Freeway allows you to overtake  
expensive networking and cumbersome  
cable swapping. □ Now you can transfer  
files from PC to PC: copy software  
between a 5.25" drive on one PC to a 3.5"  
drive on another. □ Use printers  
connected to the other PC, **from yours!**  
- all without effecting the user of the other  
machine. □ F2 is memory resident with  
an easy to use window interface.

**\$199 inc. tax.** □ Supplied with a 5 metre cable  
**F8 FREEWAY coming soon**

**≡ (03) 887 0760 ≡**  
**INTERACTIVE ELECTRONICS**

# Australian Personal Computer MARKETPLACE

## HARDWARE

### SUPERBUFFER

**SUPER BUFFER** is a memory resident disk cache program\*. Disk accessing is sped up by as much as 4 times or more by storing frequently used disk sectors in conventional or expanded memory.

Enhance your system's performance, order your **SUPER BUFFER** today for **ONLY \$79.** inc. postage.

Send cheque or specify C.O.D. with order to:

**KINGDOM SOFTWARE**  
267A Doghill Road, Baldivis W.A. 6167

Call (09) 524 1220 or write for further information.

\* IBM PC or compatible only.

### CABLE ASSEMBLY

- Non Standard Pin Configuration
- Non Standard Lengths
- Quick Efficient Service - Generally 24 Hours Depending On Quantity

### NETWORK CABLING

- Single Storey, Multi Storey Not A Problem
  - Specialists In Novell, Xenix, Unix
- DUELTEK ALSO PROVIDES PROMPT MAINTENANCE ON ALL MAJOR IBM COMPATIBLES**

**DUELTEK**  
PTY LTD

19 Lacey St, Croydon, Vic 3136  
Ph: (03) 725 1911 Fax: (03) 725 1126

## ATRON

### "THE BUGBUSTERS"

HARDWARE ASSISTED DEBUGGERS

### Ever heard of Borland?

"Without **ATRON**," says its president Philippe Kahn "there wouldn't be **SIDEKICK** and **TURBO LIGHTNING** would be light years away."

**ATRON PROBES** solve those problems like "How did I get here?" and "What are the interrupts doing?" Finds out where your program overwrites memory.

### AT-PROBE and 386 PROBE

- Supports source level debugging with languages like MICRO SOFT "C", WINDOWS
- Debug 80286 protected-mode software
- 1 MByte hidden, write-protected memory
- Real-Time dequed trace
- Real-Time sequential breakpoints
- Crash recovery switch-box when your program hangs.

RING US AND ASK FOR OUR 50 PAGE BOOKLET

**MACRO DYNAMICS**  
PTY LTD

Suite 7, 322 Mountain Hwy, Wantima  
Tel: (03) 720 2399  
Fax: (03) 720 2486

### AMAZING 386 SYSTEM

- 80386-16 CPU, 16/20 MHZ, ZERO WAIT
- 32 BIT 1MB RAM EXPANDABLE TO 16 MB
- 1.2MB HIGH DENSITY FLOPPY DRIVE
- HARD DISK & FLOPPY CONTROLLER
- AT MULTI I/O CARD (2S/1P/1G)
- MONOCHROME OR COLOUR GRAPHIC CARD
- 200 WATTS POWER SUPPLY
- ENHANCED AT STYLE KEYBOARD
- SYSTEM RESET BUTTON & SPEED SWITCH
- LICENSED PHEONIX BIOS
- RUNS UNIX & XENIX OPERATING SYSTEM & OS/2 COMPATIBLE

**\$4600.00 TAX INCLUDED**

**TECHCONIC**

COMPUTER SYSTEMS PTY LTD  
78 JOHNSON STREET, FITZROY VIC 3065  
TEL: (03) 417 2461 FAX: (03) 417 7729

## ATTENTION NEW RELEASE PRODUCTS

**TSD** telephone safety device. Protects your valuable life or any phone equipment connected to the phone lines from static or lightning strikes. **\$39.50**

**FAXMATE** Single phone line FAX-PHONE switching system answers with voice and if it's a fax receives or if voice will ring. Phone for voice. **\$450.00**

**FAXMATE** without voice **\$220.00**

**MODEMS** Kits 300/300 1200/75 (Viatel) from **\$95.00**

**Maxwell-3** 300/300 1200/75 75/1200 1200/1200 Auto Hayes **\$440.00**

**MAX-3** 2400/2400 1200/1200 300/300 Auto Hayes. Small & compact **\$420.00**

Fax machine small compact group 2 & 3 with phone **\$1550.00**

**PUBLIC DOMAIN SOFTWARE** we have over 180 Mega bytes. YOU NAME IT WE THINK WE HAVE IT.

Catalogue disk **\$12.00 inc postage.**

30 Meg hard disk drives complete with controller card **\$560.00**

Visa/Mastercard/Bankcard **WELCOME**  
High Density 96TPI Diskettes **\$30.00**  
Box of 10.

**ABE**

**COMPUTERS**  
24 Burwood Hwy, Burwood Vic 3125  
Ph: (03) 288 2144 (03) 288 9067  
Fax: (03) 288 0781

## ARE YOU IN A XENIX FRAME OF MIND?

- SPECIALISTS IN MULTI USER BUSINESS APPLICATIONS INCLUDING ALL POPULAR INTEGRATED ACCOUNTING SOFTWARE.
- SUPPLIERS OF THE ENTIRE RANGE OF OLIVETTI BUSINESS SYSTEMS.

For all enquiries big or small  
**CALL US ON (03) 241 4044**

**YOUR HELPING HAND TO THE FUTURE**

**AUTOMATED  
OFFICE**

Shop 4, 300 Toorak Road, South Yarra 3141



# Australian Personal Computer

# MARKETPLACE

## HARDWARE

20M Hard Disk &  
Controller .....\$450  
Mitsubishi TTL  
Monitor.....\$150  
Hi-Res RGB Colour  
Monitor.....\$475  
DSDD Disk  
Top Quality.....\$8/10

**SOTEC AUSTRALIA**  
17 BRIGHTON RD, ST. KILDA 3182  
**TEL: (03) 534 0286**  
FAX: (03) 534 4691

## HARD DISKS

### HARD DISK DRIVES

Previously Configured  
& Tested

|              |       |
|--------------|-------|
| 10 MB KITS   | \$295 |
| 20 MB KITS   | \$395 |
| 30 MB V/COIL | \$535 |
| 40 MB V/COIL | CALL  |
| 70 MB V/COIL | \$895 |

### FLOPPY DISK DRIVES

|      |       |        |       |
|------|-------|--------|-------|
| 360K | \$125 | 1.2 MB | \$175 |
|------|-------|--------|-------|

Need something else? Call.  
Quantity Price Breaks  
**CALL NOW & ORDER!**  
Pacific Rim Enterprises

P.O. Box 80, Redcliffe, QLD 4020

Ph: (07) 203 8003 Fax: (07) 203 6053

## SOFTWARE

# FREE SOFTWARE!



**IBM PC  
Apple II  
Mac**

Details in our **NEW**  
**CATALOGUE**  
of cut-price &  
**FREE SOFTWARE**

For your copy, ring (03)  
**648 1191** at any time, and be  
ready to tell our receptionist  
your name, address and make of  
computer.

Or write: Tim Hartnell,  
Interface Publications (Aust.)  
Pty. Ltd., Room APC, 34 Camp  
St., Chelsea, Vic., 3196

## INTERBANK SYSTEMS

# HARD DISK DRIVE REPAIRS

TO  
**SEAGATE: TANDON**  
**MINISCRIBE: NEC**  
**MICROSCIENCE: C.M.I.**  
**RODIME: MAXTOR**  
**VERTEX: EPSON**  
**ATASI**

All repairs in our clean room.  
**NO FIX - NO CHARGE**  
Average cost of repair - **\$90.00** for  
Seagate Disk Drives.  
Phone or Fax for a quote.  
Phone: (09) 399 4105  
Fax: (09) 399 3021  
4 Hendon Way, Kelmescott, W.A. 6111

### OPTICAL DISK DRIVES



**ISI INFORMATION  
STORAGE INC.**

DICE ENGINEERING PTY. LTD.  
6 DAINTREE AVENUE, PARK ORCHARD, VIC 3114  
TELEPHONE (03) 876 4040

## PC SOFT FONTS

for HP Laserjet+, Series II or compatibles

- Standard (Times Roman, Helvetica, etc)
- *Decorative Styles* and *Special Effects*
- Dingbats, Maths, Bar Codes
- 6pt to 72pt
- Medium, Bold, *Italic*,

DEALER ENQUIRIES WELCOME

Call or Write for Catalogue

## PAPER WARFARE

88 Marsden Rd, St Marys 2760  
Phone: (02) 673-4825  
Fax: (047) 21-8634

WE ALSO SELL COMPUTERS AND ACCESSORIES

## ChequeMate

### CASH BOOK PROGRAM

Now you can maintain cashbooks on your IBM PC or com-  
patible with ease and simplicity. ChequeMate does all the  
hard work, produces all necessary reports and performs a  
full bank reconciliation. Entering information is quick and  
easy.

Up to 99 cashbooks can be kept and each cashbook can  
have its own set of up to 200 user defined dissection head-  
ings. If you would like to see this program in operation, a  
demonstration copy is available for \$10. This amount is  
deductable from the purchase price of \$295.

DEALER ENQUIRIES WELCOME

Distributed By: **INTERSOFT BUSINESS SYSTEMS**

PO Box 87, Bayswater Vic 3153

Ph: (03) 720 1696 Fax: (03) 729 4878

AH: (03) 876 4084

ChequeMate is a product of MagneticTower Pty Ltd  
50 Kalinda Rd, Ringwood Vic 3134



# MARKETPLACE

CAD/CAM

MAC PRODUCTS

BOOKS

**CAD** for the 

**APAL IS FULLY FEATURED 2-DIMENSIONAL CAD**

**BASFORD SYSTEMS** No compromise Computer Aided Drafting is now available. APAL is Computer Aided Drafting with all the features you need. Proven user Interface based on leading minicomputer CAD system. Fast and accurate for high quality Plotter or Printer output. Local support is assured. Call or write for further details and nearest dealer. Version 2.2 now available.

25 Neale Street  
Bendigo,  
Victoria, 3550  
Ph. (054) 43 3349

PRICE \$250.00

MADE IN AUSTRALIA

**Psst!**

For professional Macintosh desktop publishing—laser printing, design and layout, optical character reading and image scanning—you can't go past MacBureau. And we won't break the bank...

**MacBureau**



Ph (02) 94 5207  
Fax (02) 949 5383

CAD BUREAU, CAD SOFTWARE, HARDWARE, CAD SUPPORT, CAD SERVICE, CAD TRAINING



**RCS CADCENTRES**

728 Heidelberg Road, Alphington, Victoria 3078  
Tel: (03) 499 6404 Fax: (03) 499 7107

Step up to HIGHER QUALITY and  
INCREASED PRODUCTIVITY  
in engineering design and documentation.

**THE CAD DEALERS WITH EXPERIENCE**

A division of RCS Design Pty. Ltd. CAD Bureau since 1982

Disk over Disk ounts  
at  
**MacWare**

**RELAX**  
TECHNOLOGY

Hard-disks 30-46-60-91 MEG

P O Box 539 Kalamunda WA 6076  
Phone (09) 325-9919



**GT Computing**

**Small Business  
Accounting System**

Hardware, Software  
Accessories, Stationery

**\$2999.00**

493 Tooronga Rd  
Hawthorn East 3123  
Tel (03) 882 4664

## COMPUTER BOOKS

Over 2500 book titles for the  
hobbyist and professional.

Ask for our **FREE** catalogue  
or send \$5 for disk  
(5 1/4" IBM)

**Machine**  
Language PO Box 36,  
Brooklyn Pk, SA 5032  
(08) 353 4679

# Australian Personal Computer

# MARKETPLACE

PC RENTALS

PRINTERS

## C&PA

## LASER PRINTERS



### 10 PAGES PER MINUTE

#### Qume LaserTEN Plus

Wide range of Plug-in interfaces, font cartridges and Soft Fonts available.

R.R.P. \$4995 (ex-tax)

#### Qume ScriptEN (PostScript)

With AppleTalk, IBM, and RS232 interfaces. 35 resident fonts, dozens of major features.

R.R.P. \$7995 (ex-tax)

## C&PA

The Computer Specialists

Call for more information

|                   |                   |
|-------------------|-------------------|
| Vic (03) 544 3444 | Distributors      |
| NSW (02) 891 3699 | WA (09) 242 2622  |
| SA (08) 363 1900  | ACT (062) 85 1755 |
| Qld (07) 352 5788 |                   |

## PRINTER SPECIAL TO CLEAR AT

**\$269**

INC TAX & POST

- BROTHER 80 COL DOT MATRIX PRINTER
- TEXT & GRAPHICS
- CENTRONICS PARALLEL INTERFACE
- IBM COMPATIBLE
- LAPTOP COMPATIBLE
- BATTERY OR MAINS POWERED
- PLAIN OR THERMAL PAPER
- WEIGHS UNDER 2KG

### FLEXIBLE SYSTEMS

Phone (002) 251 185

The Page Printer  
with a Personal Flair!

## CRYSTALPRINT SERIES II™



**\$2995** (ex-tax)

L.C.S. technology at a very affordable cost.

- 100% HP LaserJet Series II emulation
- Small, compact desktop printer
- 50% smaller and 30% lighter than the leading Laser Printer
- Compact font and emulation cartridges
- Crisp, clean and professional quality printing

Ring your nearest C & PA office today for a free demonstration

## C&PA

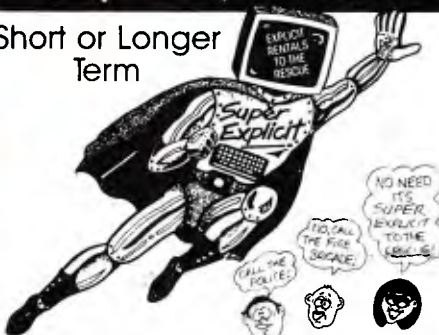
The Computer Specialists

|                   |                   |
|-------------------|-------------------|
| Vic (03) 544 3444 | Distributors      |
| NSW (02) 891 3699 | WA (09) 242 2622  |
| SA (08) 363 1900  | ACT (062) 85 1755 |
| Qld (07) 352 5788 |                   |



## Computer Rentals

Short or Longer  
Term



Very Competitive Rental Prices

- ★ IBM, PC, XT, AT and compatibles
- ★ Apple and Macintosh
- ★ Printers
- ★ Hardware Maintenance

DISTRIBUTORS OF  
SAFFIRE COMPATIBLES

For More Information:

Ph: (03) **429 8231**

**EXPLICIT COMPUTER RENTALS PTY LTD**

# 100<sup>TH</sup>

## Australian Personal Computer

TO BOOK YOUR  
ADVERTISEMENT  
IN THE 100TH  
EDITION OF  
AUSTRALIAN  
PERSONAL  
COMPUTER  
CALL  
WENDI FRASER  
ON  
(03) 531 8411  
OR  
GERARD KOHNE  
ON  
(02) 264 1266



# AD INDEX

|                                |             |
|--------------------------------|-------------|
| Abacus Software                | 194         |
| ABE Computers                  | Marketplace |
| Acer                           | 48, 49      |
| Advance Peripherals            | 244, 245    |
| Alfa Computers                 | 168         |
| Algar Burns                    | 98          |
| Allaw Sales                    | 72          |
| Alloy Australia                | 232         |
| Alldata Australia              | OBC         |
| Alltek                         | 292         |
| Amarac                         | 148         |
| Amstrad                        | 229         |
| Ann Court Computers            | 186         |
| Arcom Pacific                  | 196         |
| Artificial Intelligent Systems | 189         |
| ASP Microcomputers             | 128         |
| Atlantis International         | 108, 109    |
| Atronics International         | 224         |
| ATS Computers                  | 226         |
| Attache Software               | 37, 171     |
| Australian Business Systems    | 175         |
| Australian Creative Computing  | 194         |
| Australian Everex              | 84          |
| Austronics                     | 200         |
| Autodesk                       | 214         |
| Automation One                 | 187         |
| Avtek                          | 195         |
| AWA Distributions              | 114         |
| Barson Computers               | 191         |
| Basford Systems                | Marketplace |
| Beam Computers                 | 61          |
| Betuse                         | 252         |
| BJE Enterprises                | 69          |
| Blue Chip Electronics          | 308         |
| Bluejem Computers              | 231         |
| Brylar                         | 129         |
| Brymin Computer Supplies       | 201         |
| Budgetware                     | 284         |
| Business Tools Australasia     | 173         |
| C & PA                         | 111         |
| Calmar Business Technology     | 183         |
| Canon                          | IFC, 1      |
| Cartel                         | 253         |
| CATS                           | Marketplace |
| CC Data Computers              | 134         |
| CCH Software                   | 181         |
| Central Point                  | 228         |
| Character Software             | 178         |
| Chien Hou                      | 298         |
| Choice Marketing               | 243         |
| Compuhelp                      | 19, 21, 23  |
| Computer Capitol               | 247         |
| Computer Development           | 207         |
| Computer Discounts             | 238         |
| Cusotm Made Software           | 177         |
| Custom Computer Services       | 208, 209    |
| Dakomm Computers               | 158, 159    |
| Data Peripherals               | 162         |
| Data Products                  | 106, 107    |
| Dataparts                      | 146, 147    |
| Delta Electronics              | 296         |

|                           |                        |
|---------------------------|------------------------|
| Diamond Systems           | 115                    |
| Dice Engineering          | Marketplace            |
| Dick Smith Electronics    | 165                    |
| Dicka Data                | 24                     |
| Dimension Graphics        | 202                    |
| Discware                  | 179, 300, 301          |
| Disk Media                | Marketplace            |
| DM Software               | 211                    |
| Domino Computers          | 257                    |
| Dueltek                   | 30                     |
| Epson                     | 112, 113               |
| Explicit Computer Rentals | Marketplace            |
| Express Technology        | 259                    |
| Famous                    | 294                    |
| FBN Software              | 88                     |
| Flanour Business Systems  | 66                     |
| Flexible Systems          | Marketplace            |
| FMS                       | 198, 275               |
| Formosa                   | 296                    |
| Freesoft International    | 145                    |
| Freeware                  | 302                    |
| General Control Systems   | 240                    |
| Gestetner Lasers          | 116                    |
| GT Computing              | Marketplace            |
| Guardian Data Sysgen      | 279                    |
| Hacker Heaven             | 269                    |
| Hales and Rogers          | 166, 192               |
| Happauge                  | 60                     |
| Hearne Marketing          | 151                    |
| Hsin-Lin                  | 288                    |
| Hypertech                 | 101                    |
| IAL Software              | 174                    |
| Ideal Systems             | 169                    |
| Information Unlimited     | 178                    |
| Inforvision               | 309                    |
| Intelligent Nexus Corp    | 133                    |
| Interactive Electronics   | Marketplace            |
| Interbank                 | Marketplace            |
| Interface Electronics     | 143                    |
| Interface Publications    | Marketplace            |
| Intersoft                 | Marketplace            |
| Iomega International      | 152                    |
| IPL Datron                | 156, 235, 251          |
| JIT Australia             | 6, 7                   |
| John Sorenson Software    | 182                    |
| Jorgen Computer Services  | 180                    |
| Kalpine Enterprises       | 15                     |
| Kaypro Computers          | 83                     |
| KCM Computers             | Marketplace            |
| Keller Automation         | 78, 118, 119           |
| Keylink                   | 55                     |
| Kingdom Software          | Marketplace            |
| Kookaburra Computers      | 121                    |
| Kun Ying                  | 311                    |
| Lazarus Ribbons           | Marketplace            |
| Living Image              | 20                     |
| Logicraft                 | 14                     |
| Logo Computer Centre      | 57                     |
| Mac Bureau                | Marketplace            |
| Macanza                   | 285                    |
| Machine Language          | Marketplace            |
| Macro Dynamics            | Marketplace            |
| Macworld                  | Marketplace            |
| Maestro                   | 239                    |
| Mainstream Computers      | 132                    |
| Manacomm                  | 255                    |
| Management Control System | 186                    |
| Marketworld               | 89, 91, 93, 95, 97, 99 |
| Martlett Software         | 43                     |
| Martot Computer Products  | 278                    |
| Megadata                  | 287                    |
| Meglas                    | 197                    |
| Micro Australia           | 39                     |
| Micro Byte Computers      | 215                    |
| Micro Data Management     | 205                    |
| Micro Educational         | 293                    |
| Micro Management          | Marketplace            |
| Micro Mania               | 52, 53                 |
| Micro Sales               | 4, 76, 77              |
| Micro Science Computers   | 296                    |
| Micro Station             | 252                    |
| Microarts                 | 22                     |
| Microdos Computers        | 237                    |
| Microgram                 | 271                    |

|                              |                    |
|------------------------------|--------------------|
| Microland                    | 70, 71             |
| Micromart                    | 163, 199           |
| Micropro Computers           | 219                |
| Microshack                   | 230                |
| Microtek                     | 210                |
| Microway                     | 18                 |
| Mike Boorne Electronics      | 236, 289           |
| Mitac                        | 79                 |
| Mosaic Electronics           | 310                |
| Natcomp Technology           | 31-36              |
| National Panasonic           | 110                |
| New Tech                     | 286                |
| Odyssey Developments         | 62                 |
| Oxford Systematics           | 68                 |
| P&C Shitten                  | 294                |
| Pacific Rim Enterprise       | Marketplace        |
| Paper Warfare                | Marketplace        |
| PC Accessories               | 249                |
| PC Extras                    | 9                  |
| Pc Imports                   | 227                |
| Peak Pacific                 | 217, 219           |
| Peripheral Systems           | 305, 307           |
| Personal Computer Software   | 74                 |
| Picksoft                     | 59                 |
| Polaroid                     | 50                 |
| Porchester Computers         | 17, 26             |
| Practical Solutions          | Marketplace        |
| Printer Wholesalers          | 122                |
| Programs Plus                | 13                 |
| Quarterdeck                  | 120                |
| Quartz Australia             | 42                 |
| Quercus                      | 164                |
| Rampage Computers            | 217                |
| RCS Design                   | Marketplace        |
| Reckon Software              | 117, 161, 170      |
| Replex                       | 260                |
| Ribbons, Rolls and Printers  | 116                |
| Rod Irving Electronics       | 138, 139, 154, 155 |
| Royal                        | 282                |
| Sancom                       | 80, 261            |
| Sant Technology              | 137                |
| SBT Australia                | 184                |
| Schmitt Electronics          | 225                |
| Select Software              | 131                |
| Servcorp                     | 216                |
| Sharp                        | 220                |
| Siemens                      | 125                |
| Silicon City                 | IBC                |
| Simon & May Consulting       | 288                |
| SME                          | 290                |
| Soft Centre                  | 313                |
| Software Express             | 140                |
| Solid Software               | 281                |
| Solutions                    | 81                 |
| Sotec                        | Marketplace        |
| Spectra Soft                 | 222                |
| Step Up Systems              | 264                |
| Sujon Computers              | 92                 |
| Sun Moon Star                | 286                |
| Sybond Services              | 51                 |
| Syncomp                      | 306                |
| TCG                          | 105                |
| Techconic                    | Marketplace        |
| The Automated Office         | Marketplace        |
| The Computer Knowledge Group | 273                |
| The Computer Shark           | 64                 |
| The Computer Trader          | 41, 127            |
| The PC Pty Ltd               | 126                |
| The Ribbon Reinking Co       | Marketplace        |
| Toshiba                      | 47                 |
| Ultrapase Computers          | 283                |
| Uni Systems                  | 263                |
| Uni-x Computers              | 267                |
| Unique Micro Design          | 94                 |
| United Computer Group        | 185                |
| Uptime Computers             | 11                 |
| Vapourware Systems           | 276, 277           |
| Video Seven                  | 40                 |
| Wyong Business Systems       | 197                |
| Wyse                         | 44                 |
| Xidex                        | 87                 |
| Xtratek                      | 160                |
| Zenith                       | 144                |
| Zimwil                       | 260                |

## COMPUTER ★ REPAIR ★

- ☆ We are specialized in IBM and CLONES
- ☆ We also care for Apple and CLONES
- ☆ We look at your problem very long and hard (we never give-up)
- ☆ Quick turn around, LOW RATES
- ☆ Easy parking, open 6 days (9.30 am-7 pm)

**HANTRON DATA SYSTEMS (HDS)**  
Unit 4, 191 Victoria Road,  
Gladesville 2111.  
Tel: (02) 816-3879





# IF YOU'RE GOING TO TOWN ON PRICE ALONE YOU'RE ON THE WRONG TRACK



## ULTRA<sup>from</sup>IMAGINEERING



### ULTRA AT 40Mb EGA \$3795

- Microsoft DOS 3.3 - GW BASIC • 10 MHz
- Zero Wait State • 1Mb RAM • Clock/Calendar
- Serial/Parallel/Games Port • Small Foot Print
- 40Mb Hard Disk • EGA Card • Teco 14" EGA Monitor



### ULTRA XT 20Mb Mono \$1995

- MS-DOS 3.3 - GW BASIC • 640Kb RAM
- 360Kb Floppy Disk Drive • 4.77/10 MHz CPU
- Clock Calendar • Serial/Parallel/Games Port
- Mono Graphics Card • 20Mb Hard Disk
- Monochrome Monitor



### SHARP 4521 20Mb XT \$4995 Laptop incl. tax

- 80188 Processor, 7.16 MHz • 640Kb Ram
- 20Mb Hard Disk • 3.5" 720Kb FDD • Superwrist Crystal Display • 88-key keyboard • Serial/Parallel ports • 3 hour battery life • Dos & GW Basic
- 4521 carry case • Netcomm pocket modem

**FREE** Carry Case & Netcomm Pocket Modem



Microsoft Word  
\$695

TECO 5154 14" EGA  
\$690



Q&A \$520

TECO 5155 14" Multiscan  
\$895



Quattro \$290

### NETCOMM MODEMS

|                   |       |
|-------------------|-------|
| Pocket Modem      | \$495 |
| 123 In Modem      | \$455 |
| 1234 In Modem     | \$557 |
| Automodem 123     | \$450 |
| Automodem 1234    | \$555 |
| Smartmodem 123SA  | \$595 |
| Smartmodem 1234SA | \$775 |
| NetComm Range     | Call  |

### LASER PRINTERS

|                       |        |
|-----------------------|--------|
| Epson GQ 3500         | \$2795 |
| OKI Laser             | Call   |
| HP Laserjet Series II | \$4995 |
| Kyocera F1000         | \$5220 |
| Kyocera F1200         | \$7560 |

### PRINTERS

|                     |        |
|---------------------|--------|
| NEC 5200            | \$1049 |
| NEC 5300            | \$1499 |
| Epson LQ500         | \$775  |
| Epson LQ2500+       | \$1958 |
| Epson FX1050        | \$1145 |
| Toshiba P341SL      | \$1250 |
| Toshiba P351SX      | \$1955 |
| Brother Range       | Call   |
| IBM Quietwriter III | \$2799 |
| Fujitsu DL 3400     | Call   |
| Fujitsu DX 2300     | Call   |
| Teco 80 col 9 pin   | \$428  |
| Panasonic 80 col    | \$375  |
| Star NX1000         | \$460  |
| OKI 391             | Call   |

### MONITORS

|                      |        |
|----------------------|--------|
| ADI EGA 14"          | \$812  |
| Thompson 12" Mono    | \$168  |
| NEC Multisync II     | \$1125 |
| Eizo 8060S Flexiscan | Call   |
| Teco EGA 14"         | \$690  |
| Teco Dual Scan Mono  | \$199  |
| Teco Multiscan       | \$895  |
| Teco Multiscan VGA   | \$995  |

### LAPTOPS

|                           |        |
|---------------------------|--------|
| Toshiba T1200 Dual Floppy | \$2895 |
| Toshiba T3100 - 20        | \$6695 |
| Toshiba T5100             | \$9995 |
| Sharp 4521 20Mb XT Laptop | \$4995 |
| Compaq Portable III/20    | \$6955 |

### OTHER ULTRA CONFIGURATIONS

|                           |        |
|---------------------------|--------|
| Ultra XT Dual Floppy      | \$1695 |
| Ultra XT 30Mb Mono System | \$1995 |
| Ultra XT 30Mb CGA System  | \$2395 |
| Ultra XT 40Mb EGA System  | \$2795 |
| Ultra AT 20Mb Mono System | \$2995 |
| Ultra AT 40Mb Mono System | \$3095 |
| Ultra AT 40Mb EGA System  | \$3795 |

Seagate 30Mb with Controller

**\$495**

Seagate 20Mb w/o Controller

**\$375**

Rodime 44Mb Voice Coil  
3.5", 28 Millisecond  
Access Speed

**\$895**

### DISK DRIVES

|                              |        |
|------------------------------|--------|
| Seagate 20Mb w/o Cont        | \$375  |
| Chinnon 1.44Mb 3.5" FDD      | \$275  |
| Miniscribe Drivecard 30Mb    | \$750  |
| Plus Hardcard 20Mb           | \$1375 |
| Miniscribe 42Mb              | \$560  |
| CDC Wren II 72Mb             | \$1795 |
| Microscience 44Mb Voice Coil | \$975  |
| Sysgen PS 2 ext. FDD         | \$819  |
| 3.5" FDD 720Kb               | \$199  |

### GENERAL SOFTWARE

|                |       |
|----------------|-------|
| Quattro        | \$290 |
| Paradox        | \$955 |
| DBase III Plus | \$825 |
| Q&A            | \$520 |

|                        |       |
|------------------------|-------|
| Microsoft Word         | \$695 |
| Wordperfect V4.2       | \$585 |
| Wordperfect V5.0       | \$680 |
| First Choice           | \$210 |
| Multimate Advantage II | \$725 |
| Harvard Graphics       | \$614 |
| Wordstar 2000 + REL 3  | \$495 |
| Wordstar Pro V5        | \$425 |
| Excel                  | \$813 |
| MS Mouse Ser/Bus/PS/2  | \$225 |
| Window V2              | \$155 |
| Quick Basic Compiler   | \$125 |
| Microsoft Range        | Call  |
| Sidekick Plus          | \$290 |
| Turbo C                | \$135 |
| Turbo Pascal           | \$135 |
| Borland Range          | Call  |
| Norton Adv             | \$195 |
| Norton Utilities V4    | \$121 |
| Nortons Commander      | \$105 |
| Nortons Editor         | \$105 |
| PC Tools Deluxe        | \$109 |
| Crosstalk              | Call  |
| XTREE Pro              | \$185 |
| Carbon Copy Plus       | \$310 |
| MACE V4.1              | \$165 |

### GENERAL HARDWARE

|                               |        |
|-------------------------------|--------|
| Irma 3270 Board               | Call   |
| AST 5251/11 Plus Local        | \$1395 |
| AST Six Pack Plus             | \$249  |
| Eagle 800 x 600 EGA           | \$395  |
| Hercules Graphics Plus        | \$439  |
| Hyperformance 12.5MHz         | Call   |
| Hyperace 286 Plus             | \$675  |
| Logitech Mouse Bus/Ser        | \$159  |
| Intel Above Board 286         | \$975  |
| Vega Deluxe                   | \$557  |
| Vega VGA                      | \$740  |
| Intel 8087 (4.77 MHz)         | \$235  |
| Intel 8087/2 (8 MHz)          | \$325  |
| Intel 80287/6 (8 MHz)         | \$335  |
| Intel 80287/8 (12 MHz)        | \$495  |
| Paradise EGA Auto Switch      | \$295  |
| DFI Mouse + Dr. Halo Graphics | \$135  |
| Paradise VGA Auto Switch      | \$545  |
| IDEAssociates Range           | Call   |

\* All prices correct at date of publication and subject to stock availability.



TO

# SILICON CITY

Sydney (02) 712 2911  
Fax (02) 713 8608  
308 Great North Rd. Abbotsford 2046, PO Box 131 Five Dock 2046  
Brisbane (07) 891 5515  
Fax (07) 891 5506  
Cnr Logan Rd & Jurgens St. Wollongabba QLD 4102  
Perth (09) 221 3744  
Fax (09) 221 3745  
176 Wittenoom St. East Perth WA 6000  
Adelaide (08) 373 2500  
Fax (08) 373 2505  
1 Markay St. Eastwood SA 5063





## BRISTOL RESEARCH: SWITCHED-ON AT COMPUTERS

Bristol Research brings you tomorrow's technology today, with the latest series of advanced personal computers available through selected dealers.

Bristol Research computers have been designed and developed to meet the market's changing needs for reliability, speed, compatibility, performance, expandability - and price.

Stringent testing, both in the US

and Australia, ensures unmatched reliability.

Heart of these advanced AT's is a top quality US-manufactured 12 MHz motherboard, extensively used in computer-aided design (CAD) and desktop publishing applications. (In fact, anywhere a high speed CPU is an asset).

The Bristol Research AT computer series has a working speed of 16 MHz, with a very fast RAM access time of 80 nano seconds.



POWER LED, TURBO, LOCK, RESET, COM 1, COM 2, LPT 1, & LPT 2 DISPLAYS

**Cost effective and technically refined for home or business.**

# ALLDATA AUSTRALIA

Suite 7, 57 Robinson Street Dandenong Vic. 3175 Phone: (03) 794 6714 Fax: (03) 794 0668

# BRISTOL

RESEARCH

WAL  
Parts and